KENT PUBLIC HEALTH OBSERVATORY

Maternity needs assessment

March 2017

Produced by

Claire Winslade: Public Health Specialty Registrar (Claire.Winslade@Kent.gov.uk)
Del Herridge: Public Health Product & Data Manager (Del.Herridge@kent.gov.uk)
Emily Silcock: Public Health Information Analyst (Emily.Silcock@Kent.gov.uk)
Rachel Kennard: Senior Intelligence Analyst (Rachel.Kennard @Kent.gov.uk)
Correspondence to: Claire Winslade

Kent County Council
kent.gov.uk

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Executive Summary

The foundations for virtually every aspect of human development – physical, intellectual and emotional – are laid down in pregnancy and early childhood. The physical and mental wellbeing of the mother, fetal exposures in the womb and early childhood experience have lifelong impacts on many aspects of health and wellbeing (The Marmot Review, 2010) (Wave Trust, 2013). This needs assessment attempts to analyse the impact of smoking, obesity and long term conditions in Kent mothers on service use and cost during pregnancy and in the six months following delivery.

A number of recently published national and local policies and strategies recognise the importance of maternity services providing safer, more personalised care which is based around an individual woman's needs. Better Births (NHS England, 2016) recommends that providers and commissioners work together in a local maternity system to implement the changes to maternity services that will be required. Stillbirth rates in England remain high, and tackling the high rates of smoking in pregnancy will be crucial if these are to be reduced.

Projected demographic changes mean that this work will take place in the context of an increased demand for maternity services as a result of population growth. In some parts of Kent, as a result of planned housing developments, this is likely to be considerable. This needs assessment provides updated demographic information on the characteristics of women giving birth in Kent.

Smoking in pregnancy is associated with a wide range of problems, including complications during labour, increased risk of stillbirth, miscarriage, premature birth, low birth weight and sudden unexpected death in infancy (NICE, 2010). In 2015/16 Kent had a significantly higher percentage of mothers smoking at time of delivery (12.98%) than England (10.65%). This was particularly high in South Kent Coast (16.81%), Swale (20.52%) and Thanet (18.97%). Analysis of local data using the Kent Integrated Dataset (KID) suggests that service use and costs, both during and after pregnancy, is higher for women and their babies, among women who smoke.

Although data on maternal BMI is not routinely collected at a national level, approximately half of all women of childbearing age in England are either overweight or obese. Women who are obese (BMI of 30 or more) when they become pregnant have an increased risk of complications in pregnancy and childbirth (NICE, 2010). Data from Kent maternity services shows that between 48% and 55% of women are either overweight or obese at booking. Analysis of data from the KID suggests that service use and costs, both during and after pregnancy, is higher for women and their babies, among women who are obese.

The state of a woman's health before pregnancy can impact on her wellbeing throughout pregnancy as well as the health of her baby. Some health conditions will require careful monitoring to minimise any associated risk. Analysis of data from the KID suggests that just under two in five pregnant women in Kent have at least one long term condition. The most

common were mental health conditions in 21% and respiratory conditions in 15% of women. The analysis shows that smokers and obese women are more likely to have long term conditions prior to pregnancy, and particularly multiple long term conditions. Data suggests that service use and costs during and after pregnancy, is higher for women and their babies, among women with long term conditions.

NHS RightCare (2016) has compared CCGs with the 10 CCGs most demographically similar to them, on selected indicators, in order to identify realistic opportunities to improve the health of the local population. This peer comparison demonstrates that there is clear scope for improvement in smoking at time of delivery rates in a number of the Kent CCGs and not just those with the highest overall rates. Other target areas include flu vaccination and breastfeeding.

This needs assessment demonstrates the impact of smoking, obesity and long term conditions in terms of service use and costs among pregnant women and their babies. Although limitations in the datasets available meant it was not possible to look at outcomes for these groups locally, the picture from research is clear; smokers and obese women and their babies are at increased risk of poor outcomes. Given clear evidence of effective and cost effective interventions to tackle smoking in pregnancy, this in particular needs to be a priority area for action.

The needs assessment concludes with a number of recommendations. These include recommendations on tackling the high rates of smoking in pregnancy within Kent, as well as recommendations on improving data quality and availability. The local maternity system, which has recently been established across Kent and Medway, has been identified as the most appropriate group to take forward the findings and recommendations within this needs assessment.

| 1. Introduction

It is now widely accepted that the foundations for virtually every aspect of human development – physical, intellectual and emotional – are laid down in pregnancy and early childhood. The physical and mental wellbeing of the mother, fetal exposures in the womb and early childhood experience have lifelong impacts on many aspects of health and wellbeing – from obesity, heart disease and mental health, to educational achievement and economic status. (The Marmot Review, 2010) (Wave Trust, 2013)

Although there is still a lot to learn about the mechanisms of fetal programming and brain development, improving health in pregnancy and early childhood now forms a central pillar of national and local health improvement policy and is reflected in strategies that aim to give every child the best start in life.

Evidence indicates that early intervention by midwives can lead to a direct reduction in the risk of poor outcomes for young children including; (Wave Trust, 2013)

- reduced risk of low birth weight and fetal injury
- improved uptake of preventative care
- lower risk of poor parent-infant bonding
- reduced child neglect and abuse.

In view of this, as well as providing updated demographic information relevant to maternity services in Kent, this needs assessment focuses in more depth on the impact of health conditions and unhealthy lifestyles during pregnancy, looking at both service use and costs associated with this. Finally, RightCare data has been reviewed to try and identify some realistic options for improvement in maternity care, based on peer comparisons.

1.1 Dataset

Demographic data have been sourced from the Public Health Birth File (PHBF) for the analysis in the first part of this needs assessment. This is a dataset containing records for all births to women residing within Kent. Birth registration data is sent by registrars to the Office for National Statistics, who process and transfer the data to NHS Digital (formally the Health and Social Care Information Centre), who then provide the data to Local Authority Public Health teams.

| 2. National and Local Policy and Strategy

There have recently been a number of key national documents published which relate to maternity services and set the direction of travel for maternity care.

- Cumberlege J. National Maternity Review. Better Births. Improving Outcomes of Maternity Services in England. A five year forward view for maternity care. NHS England, 2016.

This sets out the vision for maternity services over the next five years. The vision is that maternity services across England become safer, more personalised, kinder, professional and more family friendly; where every woman has access to information to enable her to make decisions about her care; and where she and her baby can access support that is centred around their individual needs and circumstances. In addition all staff will be supported to deliver care which is women centred, working in high performing teams, in organisations which are well led and in cultures which promote innovation, continuous learning, and break down organisational and professional boundaries.

Recommendations to achieve this include:

a. Personalised care centred on the woman, her baby and her family, based around their needs and their decisions, where they have genuine choice, informed by unbiased information. Every woman should develop a personalised care plan with her midwife and other health care professionals. Unbiased information should be made available to women, through a digital maternity tool by which they can access their records and information appropriate to them, including latest evidence and what is available to them locally. Women should be able to choose the provider of their antenatal, intrapartum and postnatal care and be in control of exercising those choices through their NHS personal maternity care budget. This includes choice about place of delivery.

b. Continuity of carer, with every woman having a midwife who is part of small team of four to six midwives based in the community who can provide continuity of care from pregnancy, through delivery to postnatally. Each team of midwives should have an identified obstetrician who can provide advice as needed. The midwife should liaise closely with other services to ensure the woman gets the support she needs.

c. Safer care, with professionals working across boundaries to ensure rapid referral and access to the right care in the right place. Provider boards should have a board level champion for maternity services who routinely monitors information about quality, including safety, and takes necessary action. Teams should routinely collect data about the quality and outcomes of their services and compare their performance against others. There should be rapid referral protocols in place between professionals and across organisations. There should be a national standardised investigation process and a system of rapid resolution and redress.

d. Better postnatal and perinatal mental health care, which is appropriately resourced, with smooth transition of care between midwifery, obstetric and neonatal services and ongoing care in the community by the GP and health visiting service.

e. Multi-professional working to deliver safe, personalised care. This should include multi-professional learning and training. A nationally agreed set of indicators should be developed. Multi-professional peer review of services should be available.

f. Working across boundaries to provide and commission maternity services. Community hubs should be established where maternity services are provided alongside other family orientated health and social services. Providers and commissioners should work together in local maternity systems covering populations of 0.5 to 1.5 million with all providers working to commonly agreed standards and protocols. Professionals, providers and commissioners should also come together on larger geographical areas through clinical networks which are coterminous for maternity and neonatal services. Commissioners should commission against clear outcome measures.

g. A payment system that fairly and adequately compensates providers for delivering high quality care to all women efficiently, while supporting commissioners to commission for personalisation, safety and choice.

- Department of Health. Safer Maternity Care: next steps towards the national maternity ambition. Department of Health, 2016.

Although still birth and neonatal mortality rates are improving, still birth rates in particular remain high and the rate of reduction is slower than in other similar countries. The national ambition is to halve the rates of stillbirths, neonatal deaths and brain injuries that occur during or soon after birth and maternal deaths by 2030. This document identifies five key drivers for safer maternity care, which are:

a. Focus on strong leadership for maternity systems at every level.
b. Focus on learning and best practice.
c. Focus on teams including promoting multi-professional team working.
d. Focus on data-improving data collection and linkages between maternity data and other clinical data sets.
e. Focus on innovation.

A range of national and local actions have been identified against these drivers, which need to be in place over the next 12-18 months.

- NHS England. Saving Babies' Lives. A care bundle for reducing stillbirth. NHS England, 2016.

NHS England has developed a 'saving babies' lives care bundle' (NHS England, 2016) designed to tackle stillbirth and early neonatal death. This brings together four elements of care recognised as evidence based and/or best practice. These are:

1. Reducing smoking in pregnancy

2. Risk assessment and surveillance for fetal growth restriction

3. Raising awareness of reduced fetal movement

4. Effective fetal monitoring during labour

- Boyd S (Ed). Maternity Standards. The Royal College of Obstetricians and Gynaecologists, 2016.

This report sets out a framework for commissioners and providers, of high level maternity service standards. The aim is to reduce variation between services and improve outcomes. They consider overarching service standards, for example communication, governance and staffing, as well as standards along the pathway from preconception through to postnatal care. Standards are based on evidence where this was available and consensus where it was not. The standards were developed recognising that:

a. high quality care is provided through services developing trusting, responsive relationships with women and families
b. providers work in collaboration with key stakeholders and engage proactively with service users and seek their views when significant changes are proposed
c. service providers respond to feedback in a timely fashion and foster a culture of learning and supportive work practices which is open and transparent in response to, and investigation of, critical incidents.

They recognise that the standards will be most effectively delivered through an interconnected system of providers.

- Shribman S and Billingham K. Healthy Child Programme: pregnancy and the first five years of life. Department of Health, 2009.

This Healthy Child Programme (HCP) is the early intervention and prevention programme for children and families. It is a progressive universal programme, which means a universal service is offered to all families with additional services for those at higher need or increased risk. This document describes the schedule for both the core universal programme and the additional targeted elements.

In 2013 a cross-party manifesto was published calling for a refocusing of parliamentary support to improve prevention and early intervention services during pregnancy and the early years. (Leadsom MP, et al., 2013) The manifesto recommends that:

a. All parents should be able to access antenatal classes which address both the physical and emotional aspects of parenthood and infant wellbeing.
b. Birth registration should be offered by local registrars in children's centres to encourage engagement with families.

c. All professionals and organisations involved in the HCP care pathway should share vital information to ensure those who need it receive timely and culturally sensitive support.

d. The health and early years workforce should receive high quality training in infant mental health and attachment.

e. At-risk families should be able to access evidence-based services which promote parent-infant interaction and parent-infant psychotherapy, delivered by qualified professionals.

f. A range of services should be available in every local area to ensure women at risk or suffering from mental health problems are given appropriate support at the earliest opportunity.

g. The NICE Guidelines recommending that every woman with a history of past or present serious mental illness should have access to a Consultant Perinatal Psychiatrist and specialist perinatal psychological care for mother and baby must be followed.

h. Local commissioning and decision making boards should consider the social and emotional health needs of babies and include this information in their Joint Strategic Needs Assessment and Local Health and Wellbeing Strategy.

Local strategies relevant to Kent's maternity services are:

- Transforming health and social care in Kent and Medway. Sustainability and Transformation Plan. (NHS, Kent County Council, Medway County Council, 2016)

Kent and Medway's draft Sustainability and Transformation Plan (STP) has recently been published. Although there is little explicit mention of maternity services within this, maternity services do have an important role to play in particular in terms of improving health and wellbeing through prevention. Examples from the STP include:

a.   Industrialising clinical treatments related to lifestyle behaviours and treat these conditions as clinical diseases.

b. Treating both physical and mental health issues concurrently and effectively

c. Concentrating prevention activities in four key areas- obesity and physical activity, smoking cessation and prevention, workplace health and reduce alcohol related harms.

- Review of the relationship between Public Health and Maternity Services with respect to the delivery of the antenatal and postnatal elements of the Healthy Child Programme (Buttivant, 2014)

This reviewed the contribution that maternity services make to the achievement of positive public health outcomes for mother, baby and family by looking at the delivery of the antenatal and postnatal elements of the Healthy Child Programme in Kent. It identified a

number of issues, in particular distinct variation between providers in their delivery of the Healthy Child Programme and their interfaces with other professionals on the maternity care pathway. It also highlighted the lack of robust performance and quality monitoring of maternity services by commissioners and the urgent need for a Kent-wide maternity service specification that requires comprehensive and universal delivery of the full nine months to one week element of the Healthy Child Programme by all providers. This needs assessment complements the information within this review rather than being an updated version of it. As such, many of the recommendations from this review will still be relevant.

- Every Day Matters: Kent's Multiagency Strategic Plan for Children and Young People 2013-2016 (Kent County Council, 2013).

This plan provides the overarching vision for Kent's children and young people, a future in which every child and young person in Kent achieves their full potential in life, whatever their background. A number of recommendations are made for improvements in the provision of support during the antenatal and postnatal period, these include:

a. Ensuring women, and their partners, have access to timely pre-pregnancy advice and support to enable early adoption of healthier lifestyle choices.
b. Providing a free NHS Information Service to parents which includes emails and texts providing NHS-approved advice.
c. Fully delivering the Healthy Child Programme (0-5 years) offering every family a programme of screening, immunisations, developmental reviews, information and guidance to support parenting and healthy choices.
d. Expansion of the Family Nurse Partnership programme in key areas across Kent.

- Kent Joint Health & Wellbeing Strategy; Outcomes for Kent 2014-2017 (Kent County Council, 2014)

This strategy describes the desired outcomes for the health and wellbeing of the population of Kent from 2014 to 2017, and the changes required to the health economy to achieve these outcomes.

One of the key aims is for every child in Kent to have the best start in life. Recommendations for action in the antenatal and postnatal period to support every child to have the best start in life include:

a. Reducing the number of pregnant women who smoke at time of delivery by strengthening midwifery and smoking cessation resources and provide a whole systems approach to engaging with and supporting pregnant smokers.
b. Increasing breastfeeding Initiation rates & breastfeeding continuation at six to eight weeks by promoting Unicef's Baby Friendly Accreditation and implementing the Infant Feeding Action Plan.

c. Continuing to use the Common Assessment Framework (CAF) as the key tool for carrying out an early help assessment and planning the necessary actions to improve children's outcomes and support their additional needs.

CCGs across Kent have Five Year Strategic Commissioning Plans in place for the period 2014-19. Unfortunately only four of the seven CCGs identified aims or objectives that specifically related to services or outcomes in the antenatal or postnatal period. These were Ashford, Canterbury & Coastal, South Kent Coast and Thanet CCGs.

A local maternity system (LMS) for Kent and Medway has recently been established, in which commissioners and providers will be working together, as recommended in Better Births to develop a local vision for improved maternity services. NHS England require an implementation plan to be submitted in late summer/ early autumn of 2017, which should be supported by consultation with service users and local communities.

Recommendations:

- That the LMS should review and prioritise the recommendations in this needs assessment, as well as those in the review of the relationship between Public Health and Maternity Services with respect to the delivery of the antenatal and postnatal elements of the Healthy Child Programme (Buttivant, 2014), and take responsibility for monitoring their implementation.

| 3. Demographics

3.1 Age structure

3.1.1   ONS CCG projections

These population projections are produced by the Office for National Statistics (ONS), and do not take into account planned housing developments.

Across Kent, the number of females aged between 15 and 44 in 2014 was 277,274 and is expected to be 296,447 by 2039, an increase of 6.9%. This increase varies across CCGs, with the biggest percentage increase expected in Dartford, Gravesham and Swanley, at 12.8%. This represents an additional 6,400 women of child bearing age.

The number of women aged 15 to 44 is expected to decrease in South Kent Coast CCG between 2014 and 2020. While the number of women in this age group does increase again, there is an anticipated 925 fewer women aged 15 to 44 in 2039 compared to 2014.

Projected female population aged 15 to 44

	2020	2025	2030	2035	2039
NHS Ashford	1.04	4.71	6.92	8.33	9.22
NHS Canterbury and Coastal	-2.66	-0.84	2.02	2.58	3.37
NHS Dartford, Gravesham and Swanley	2.49	6.74	9.34	11.23	12.81
NHS South Kent Coast	-4.28	-3.15	-2.94	-2.76	-2.72
NHS Swale	1.10	5.00	7.14	9.17	10.37
NHS Thanet	0.62	4.55	6.65	8.47	9.41
NHS West Kent	-0.20	2.94	4.59	5.97	6.84
Kent	-0.31	2.76	4.70	6.00	6.91
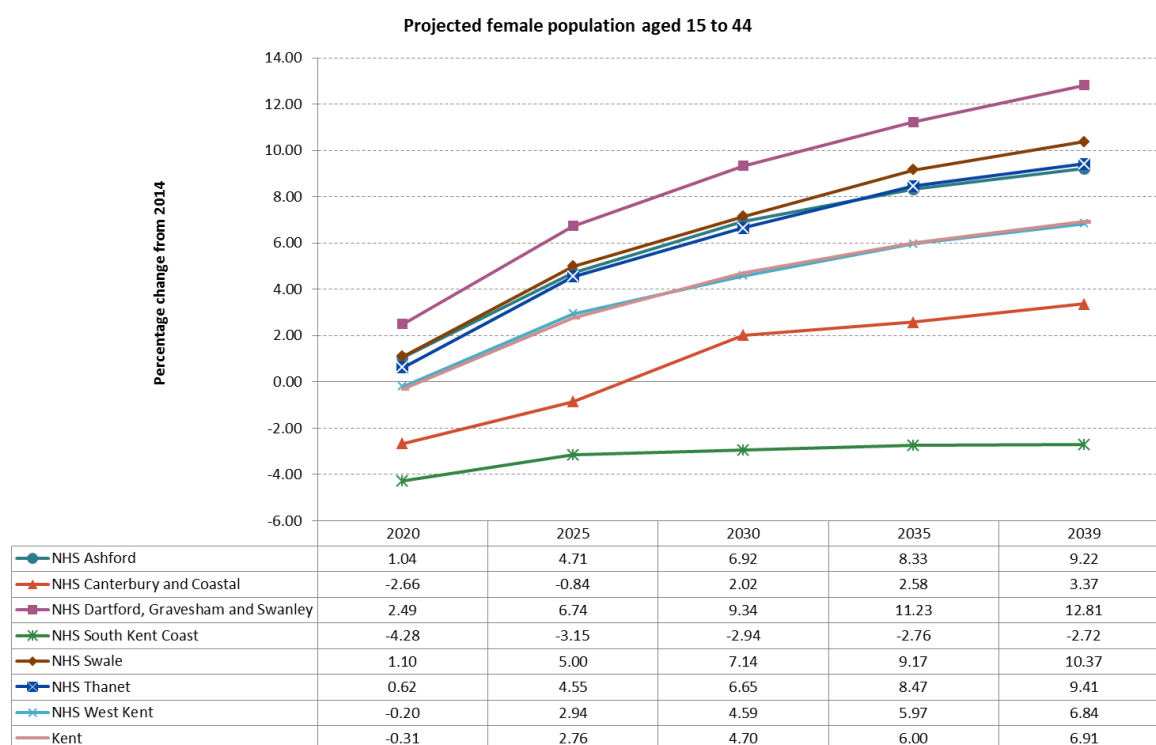
Source: ONS population projections, prepared by KPHO (ES), 10/16

Projected female population aged 15 to 44

	2014	2020	2025	2030	2035	2039
NHS Ashford	22731	22968	23802	24304	24624	24827
NHS Canterbury and Coastal	40577	39497	40235	41396	41625	41944
NHS Dartford, Gravesham and	50001	51246	53372	54669	55617	56407
NHS South Kent Coast	34022	32566	32951	33020	33085	33097
NHS Swale	20513	20739	21539	21978	22393	22640
NHS Thanet	24045	24195	25140	25644	26080	26308
NHS West Kent	85385	85215	87898	89301	90484	91224
Kent	277274	276424	284937	290313	293908	296447

Source: KCC BI, prepared by KPHO (RK), 3/17

3.1.2 KCC district projections

These population projections are produced by the Business Intelligence team within Kent County Council and take into account planned housing developments. However, data for females aged 15 to 44 is only available at a district level.

Across Kent, the number of females aged between 15 and 44 in 2013 was 276,540 and is expected to be 285,419 by 2033, an increase of 3.2%. This increase varies across districts, with the biggest percentage increase expected in Dover and Dartford, at 13.6% and 28.6% between 2013 and 2033 respectively. This represents an additional 6,008 women of child bearing age in Dartford, and 2,533 in Dover.

The number of women aged 15 to 44 is expected to decrease in Shepway, Swale, Sevenoaks and Tunbridge Wells between 2013 and 2033.
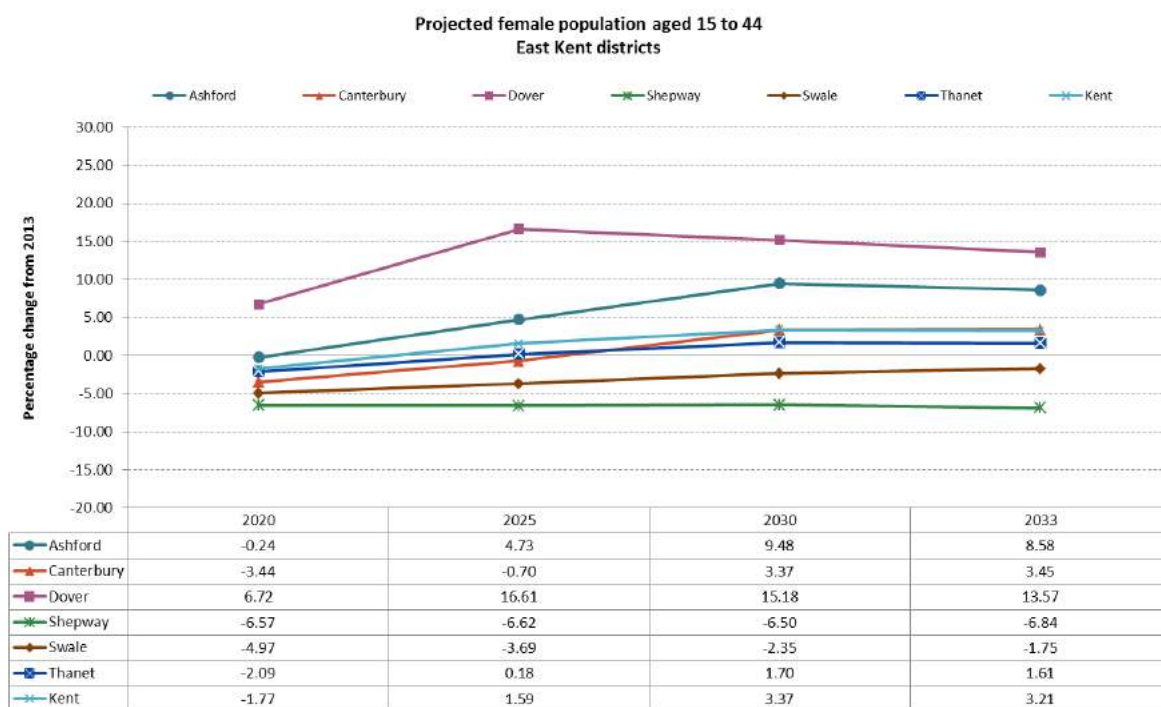
Projected female population aged 15 to 44
East Kent districts

	Ashford	Canterbury	Dover	Shepway	Swale	Thanet	Kent

	2020	2025	2030	2033
Ashford	-0.24	4.73	9.48	8.58
Canterbury	-3.44	-0.70	3.37	3.45
Dover	6.72	16.61	15.18	13.57
Shepway	-6.57	-6.62	-6.50	-6.84
Swale	-4.97	-3.69	-2.35	-1.75
Thanet	-2.09	0.18	1.70	1.61
Kent	-1.77	1.59	3.37	3.21

Source: KCC BI, prepared by KPHO (ES), 11/16

Projected female population aged 15 to 44 - East Kent districts

	2013	2020	2025	2030	2033
Ashford	22670	22615	23743	24607	24616
Canterbury	32717	31591	32487	33626	33846
Dover	18665	19919	21765	21620	21198
Shepway	18129	16938	16929	16930	16889
Swale	25510	24241	24569	24846	25064
Thanet	23866	23368	23910	24188	24250
Kent	276540	271653	280932	285144	285419

Source: KCC BI, prepared by KPHO (RK), 3/17

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Projected female population aged 15 to 44
West Kent districts

	2020	2025	2030	2033
Dartford	15.77	29.38	30.18	28.63
Gravesham	-3.82	-1.43	0.67	0.41
Maidstone	-0.52	3.16	6.48	6.97
Sevenoaks	-11.58	-15.11	-15.40	-15.63
Tonbridge & Malling	1.51	5.72	9.97	11.91
Tunbridge Wells	-11.31	-11.94	-13.90	-14.87
Kent	-1.77	1.59	3.37	3.21
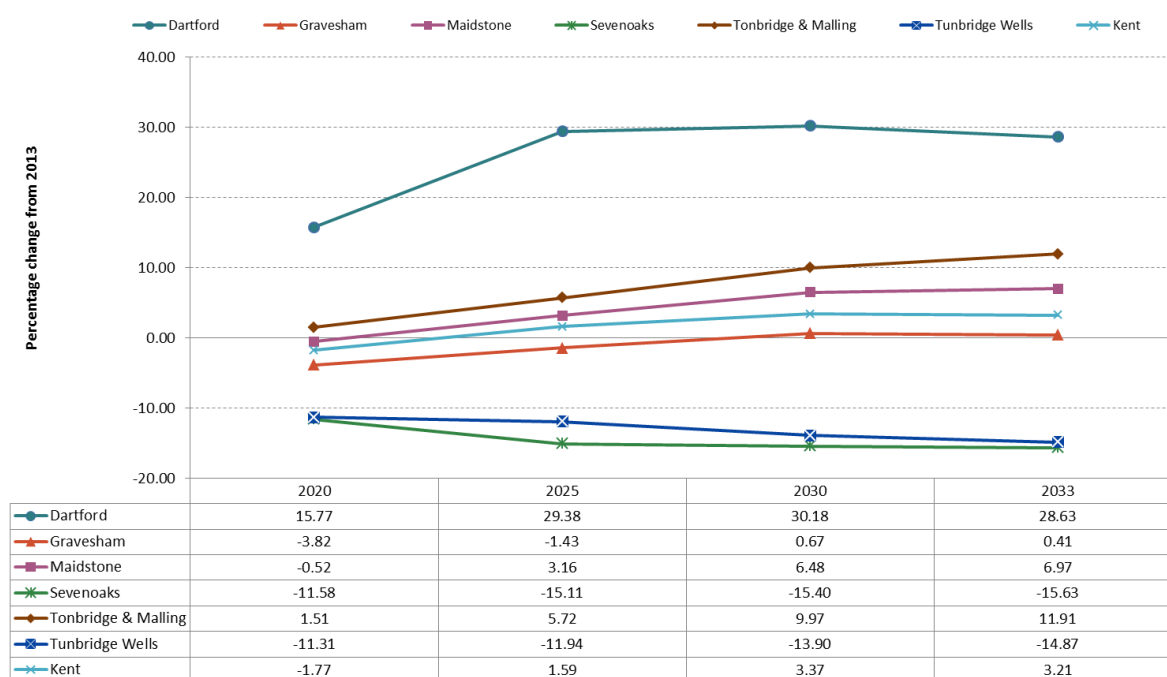
Source: KCC BI, prepared by KPHO (ES), 11/16

Projected female population aged 15 to 44 - West Kent districts

	2013	2020	2025	2030	2033
Dartford	20988	24297	27154	27406	26996
Gravesham	20486	19703	20193	20590	20569
Maidstone	29753	29597	30692	31515	31826
Sevenoaks	20152	17819	17108	17039	17003
Tonbridge & Malling	22557	22898	23848	24589	25244
Tunbridge Wells	21047	18667	18534	18188	17918
Kent	276540	271653	280932	285144	285419

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3.2 General fertility rate

The general fertility rate (GFR) is the number of live births per 1,000 women aged between 15 and 44 years.

The GFR across Kent increased between 2006 and 2012, from 56.4 births per 1,000 population to 65.1. Since then the rate has decreased, and was 62.2 live births per 1,000 females aged 15 to 44 in 2015.

Across the CCGs the rates show greater fluctuations. West Kent CCG and Swale CCG have consistently had very similar rates to that of Kent. Canterbury and Coastal CCG has a markedly lower GFR, which has been decreasing since 2008, influenced by the student population.

Projections over the next three years predict increases across all Kent CCGs with the exception of Canterbury and Coastal CCG.

General Fertility Rate
2006 to 2015, projected to 2018

Source: PHBF/ONS, prepared by KPHO (LLY), 09/16

Maternity needs assessment, March 2017
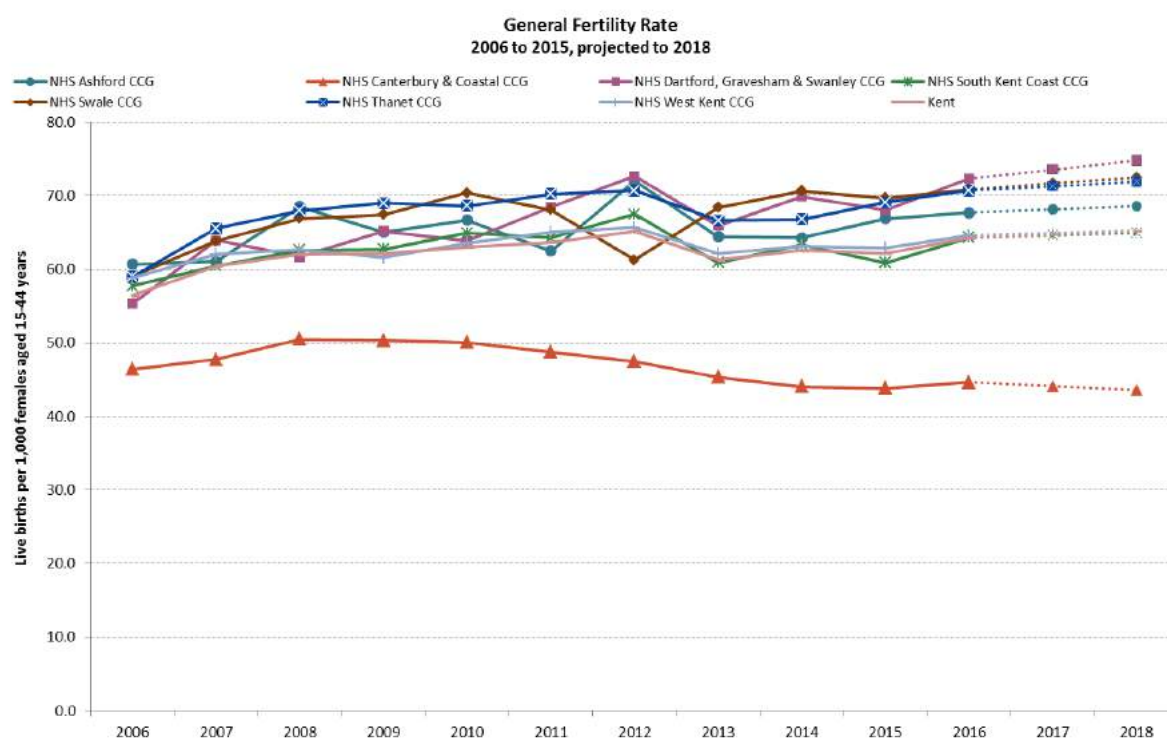
Data for 2015, shows that across Kent, there were 62.2 live births per 1,000 females aged 15 to 44. This ranged from 43.8 in Canterbury and Coastal CCG to 69.7 in Swale CCG. Ashford (66.9), Dartford, Gravesham and Swanley (68.1), Swale and Thanet (69.1) CCGs had a significantly higher GFR than Kent, while Canterbury and Coastal had a significantly lower rate.

Source: PHBF/ONS, prepared by KPHO (LLY), 09/16

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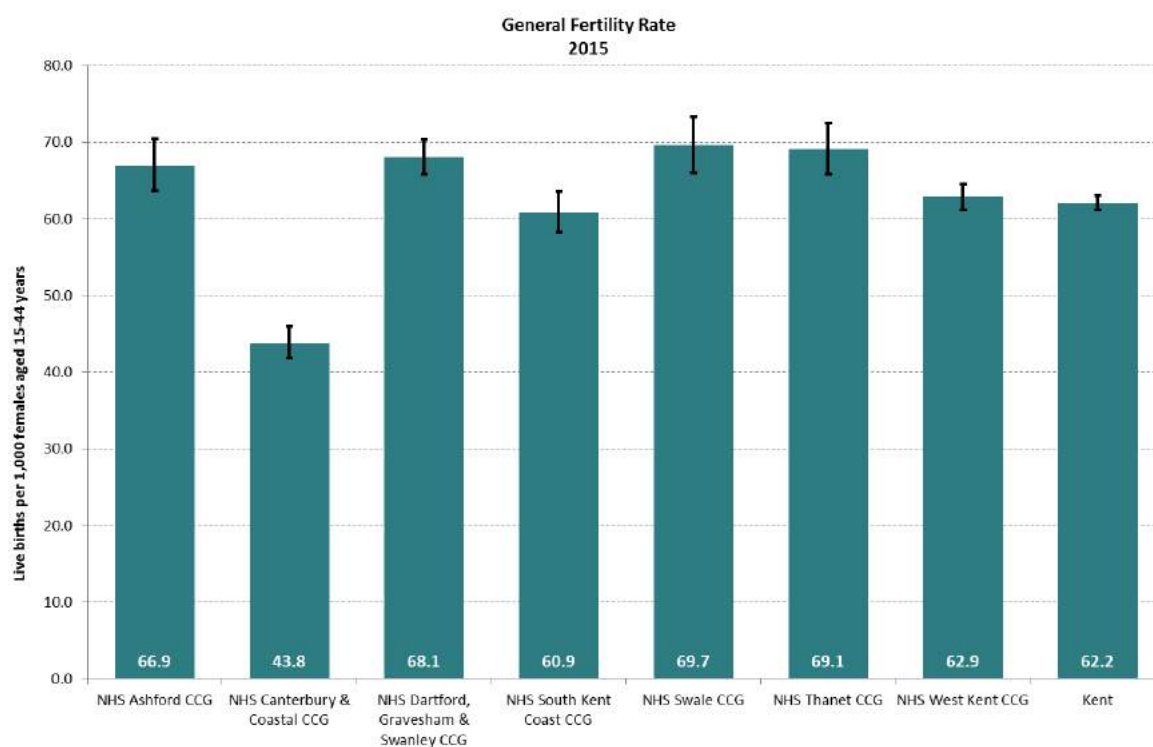
3.3 Births

The number of live births across Kent was 17,234 in 2015; 2.6% of which were born in trusts outside Kent.

Table 1: the number of live births by CCG (2010 to 2015)

CCG	2010	2011	2012	2013	2014	2015
NHS Ashford CCG	1,502	1,409	1,628	1,460	1,461	1,521
NHS Canterbury & Coastal CCG	1,973	1,930	1,899	1,826	1,788	1,779
NHS Dartford, Gravesham & Swanley CCG	3,146	3,370	3,586	3,270	3,494	3,404
NHS South Kent Coast CCG	2,289	2,257	2,344	2,090	2,156	2,071
NHS Swale CCG	1,433	1,384	1,246	1,395	1,449	1,429
NHS Thanet CCG	1,632	1,669	1,679	1,590	1,606	1,661
NHS West Kent CCG	5,480	5,602	5,609	5,306	5,393	5,369
Kent	17,455	17,621	17,991	16,937	17,347	17,234

Source: PHBF, prepared by: KPHO (LLY), 09/16

Table 2 the number of live births by trust (2010 to 2015)

Trust	2010	2011	2012	2013	2014	2015
Dartford and Gravesham NHS Trust	2882	3122	3345	3010	3226	3119
East Kent Hospitals University NHS Foundation Trust (EKHUFT)	7111	6924	7228	6710	6706	6759
Medway NHS Foundation Trust (MFT)	1409	1449	1414	1529	1495	1476
Maidstone and Tunbridge Wells NHS Trust (MTW)	4766	4978	5035	4751	4918	4905
Out of Kent	637	472	354	376	410	441
Not coded	650	676	615	561	592	534
Kent mothers	17455	17621	17991	16937	17347	17234

Source: PHBF, prepared by: KPHO (ES), 09/16

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3.4 Birth weight

Low birth weight is classified as a baby born weighing less than 2,500g. Babies born weighing less than 1,500g are categorised as very low birth weight. This is expressed as a percentage of all live births.

Across Kent, the percentage of babies born with a low birth weight has reduced slightly, from 6.2% in 2006/08 to 5.8% in 2013/15. All CCGs within Kent show a decreasing or plateauing percentage of low birth weight babies, with the exception of Dartford, Gravesham and Swanley which has increased since 2008/10. Over the next three time periods, the percentages are expected to continue to decline, particularly for Swale, Ashford and Thanet CCGs.

Low Birth Weight
The percentage of live births with a recorded birth weight of <25000g (2006/08 to 2013/2015), with projections

Source: PHBF/ONS, prepared by KPHO (LLY), 09/16

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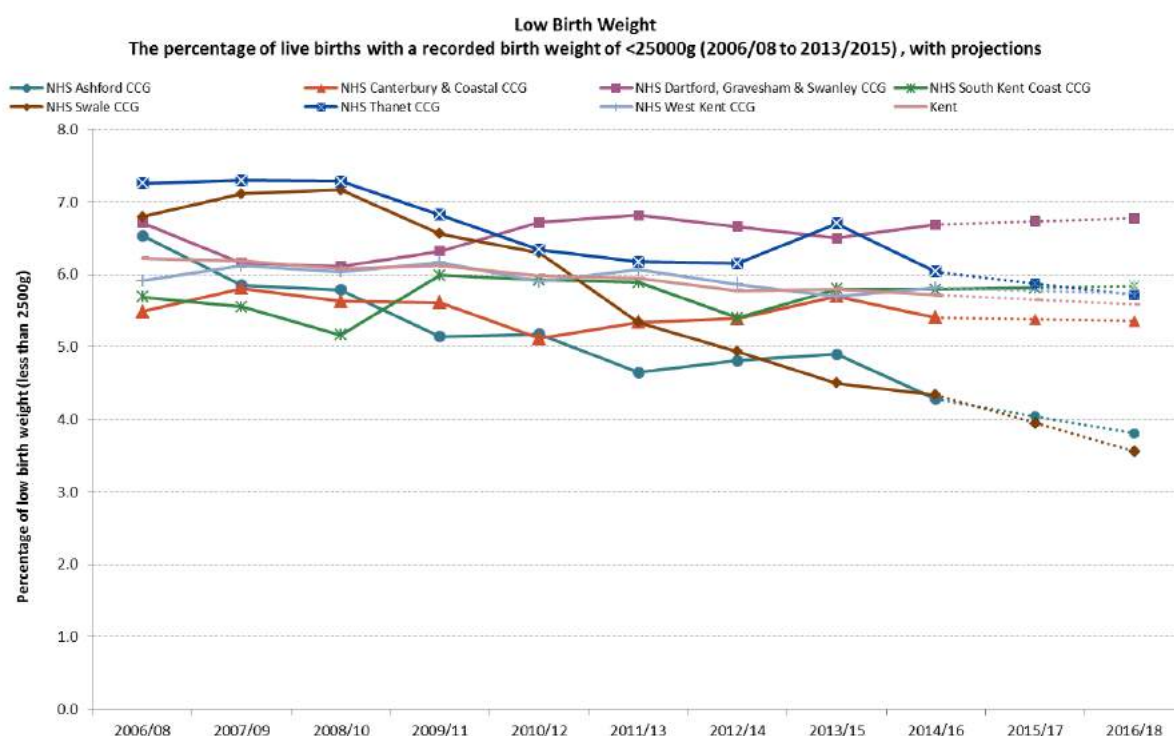
A substantially higher proportion of low birth weight babies are born in non-Kent trusts, and this percentage is increasing, rising from 10.1% in 2006/08 to 14.8% in 2013/15. The three main trusts in Kent have fairly stable percentages of low birth weight babies.

Low Birth Weight
The percentage of live births with a recorded birth weight of <25000g (2006/08 to 2013/2015), with projections

Source: PHBF/ONS, prepared by KPHO (LLY), 09/16

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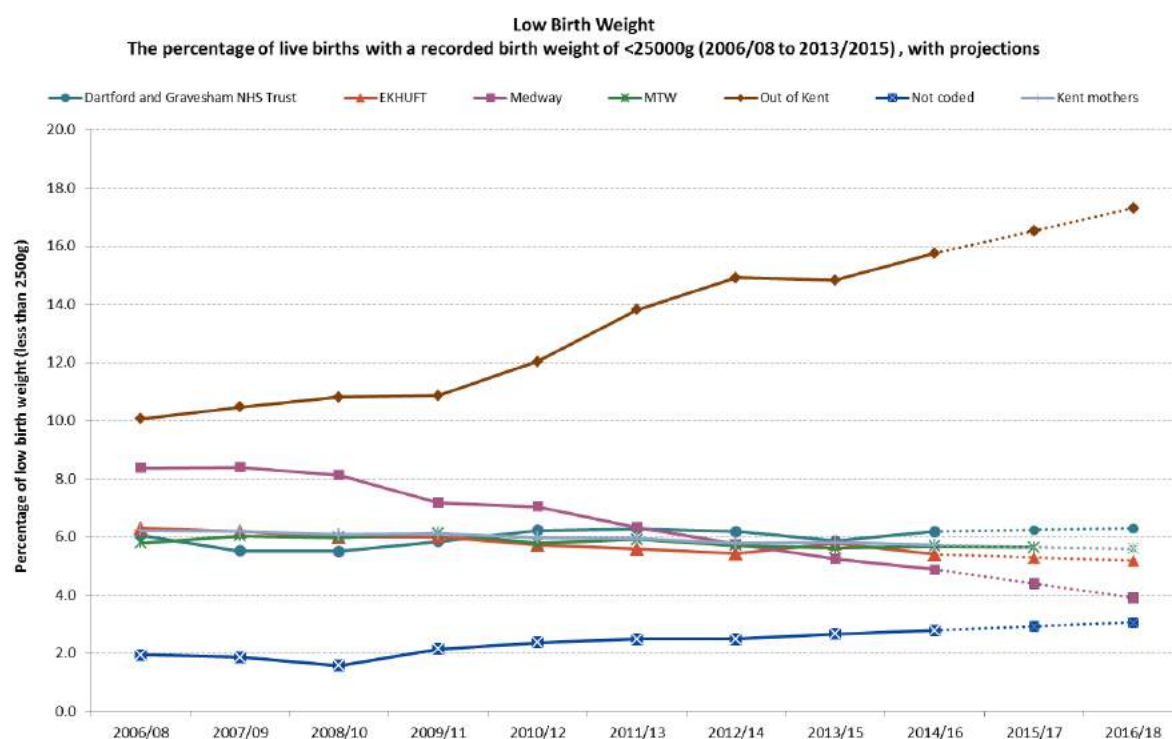
Based on pooled data for 2013-2015, 5.8% of babies born in Kent weighed less than 2,500g. Across the CCGs, this ranged from 4.5% in Swale CCG to 6.7% in Thanet CCG. The percentage of babies born weighing less than 2,500g is significantly lower in Swale CCG; none of the CCGs have a significantly higher percentage in comparison with Kent.

Low Birth Weight
2013-2015

Source: PHBF/ONS, prepared by KPHO (LLY), 09/16

Maternity needs assessment, March 2017
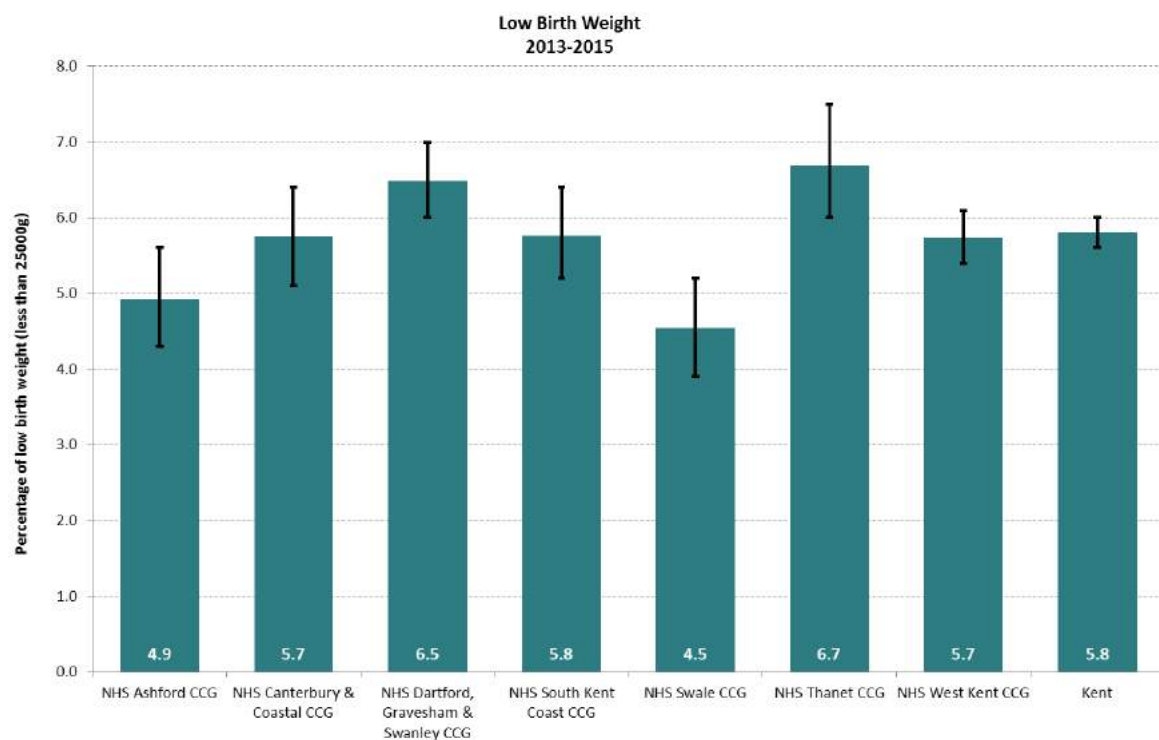
By trust, there were no significant differences in the proportion of babies born weighing under 2,500g between the main Kent trusts. The proportion born with a LBW in trusts outside Kent was significantly higher than the total, at 14.8%.

**Low Birth Weight
2013-2015**

Source: PHBF, prepared by KPHO (ES), 11/16

Maternity needs assessment, March 2017
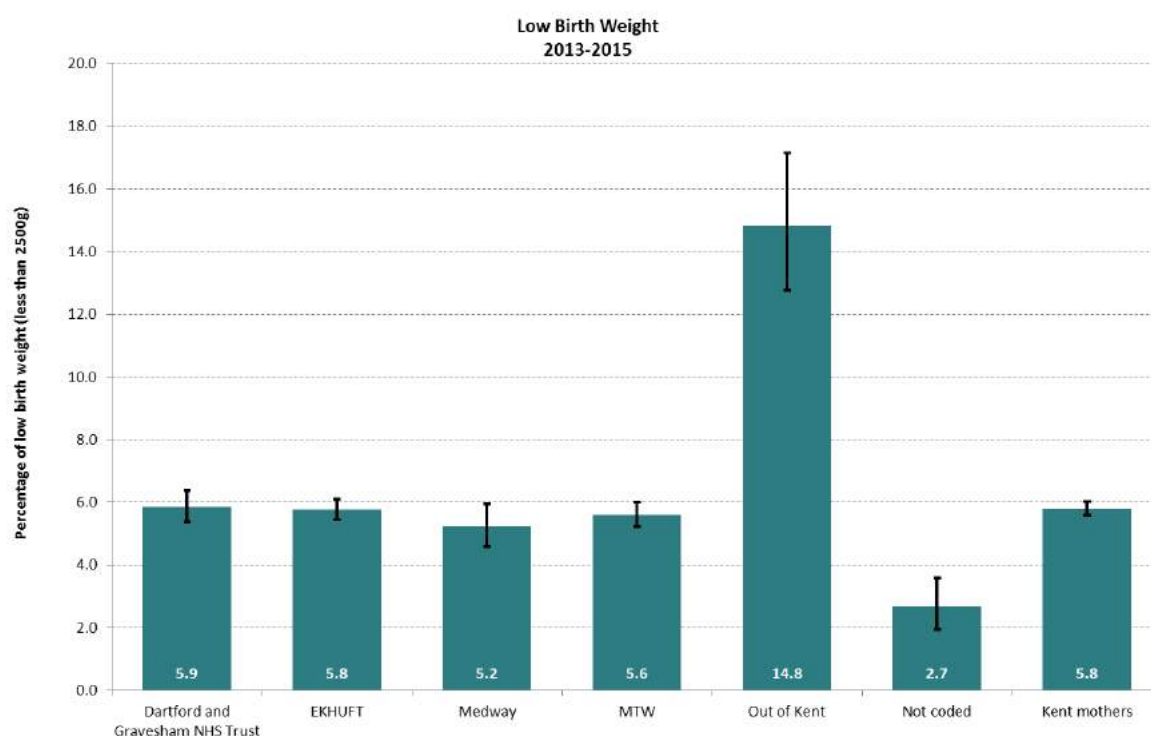
Based on pooled data for 2013-2015, 0.8% of babies born in Kent weighed less than 1,500g. Across the CCGs, this ranged from 0.3% in Swale CCG to 1.0% in Dartford, Gravesham and Swanley CCG. Swale CCG had a signficantly lower proportion of very low birth weight babies than Kent.

Very Low Birth Weight
2013-2015

Source: PHBF/ONS, prepared by KPHO (LLY), 09/16

Maternity needs assessment, March 2017
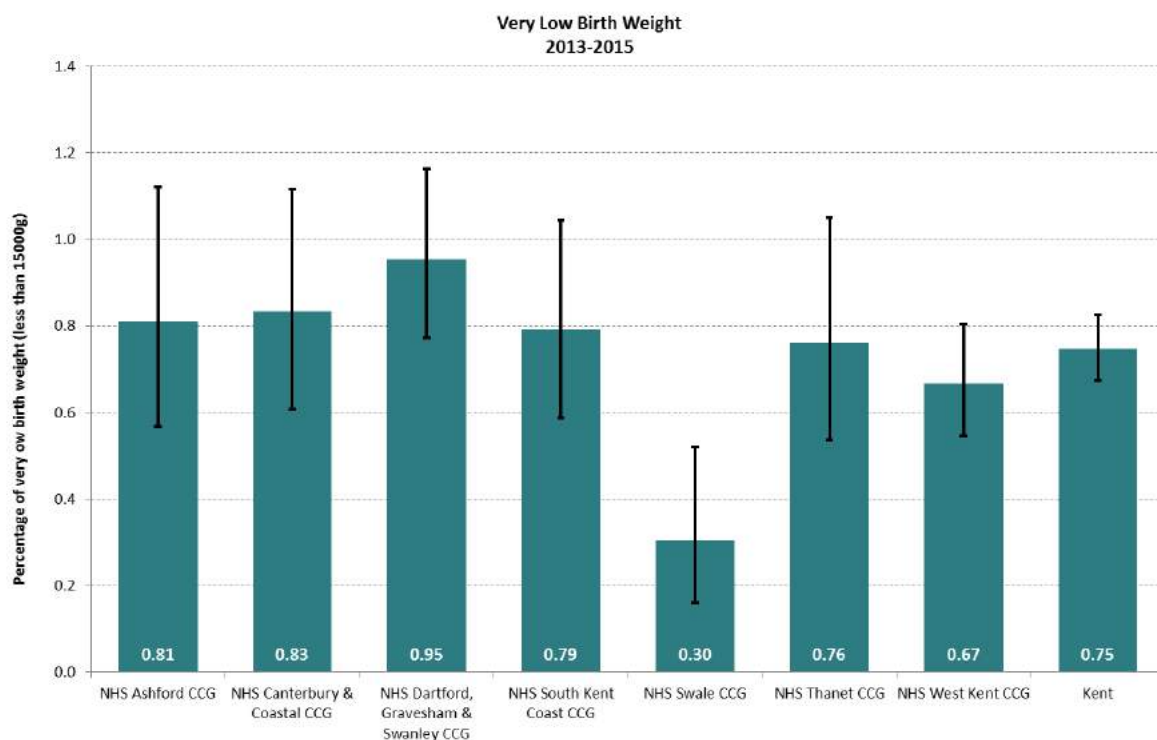
The proportion born in Trusts outside of Kent was significantly higher than the total, at 5.1%.

Very Low Birth Weight
2013-2015

Category	Value
Dartford and Gravesham NHS Trust	0.5
EKHUFT	0.8
Medway	0.7
MTW	0.5
Out of Kent	5.1
Not coded	0.4
Kent mothers	0.7

Source: PHBF, prepared by KPHO (ES), 11/16

Maternity needs assessment, March 2017
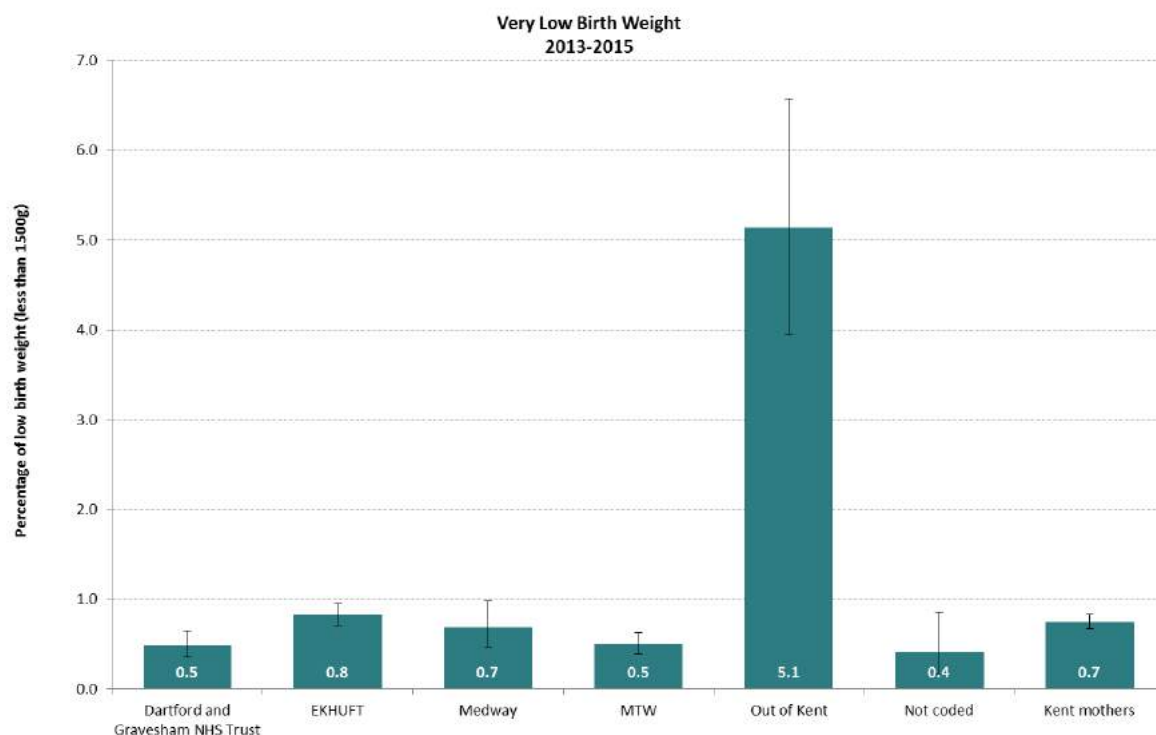
3.4.1 Deprivation

The scatterplot below shows low birth weight and income deprivation affecting children (IDACI) at an electoral ward level within Kent. There is a weak correlation (r=0.20) between IDACI and low birth weight within Kent.

Scatterplot: Income deprivation affecting children index (2015) and Low Birth Weight (2013 to 2015, pooled)

Source: PHBF, ONS, DCLG, prepared by KPHO (ES), 12/16
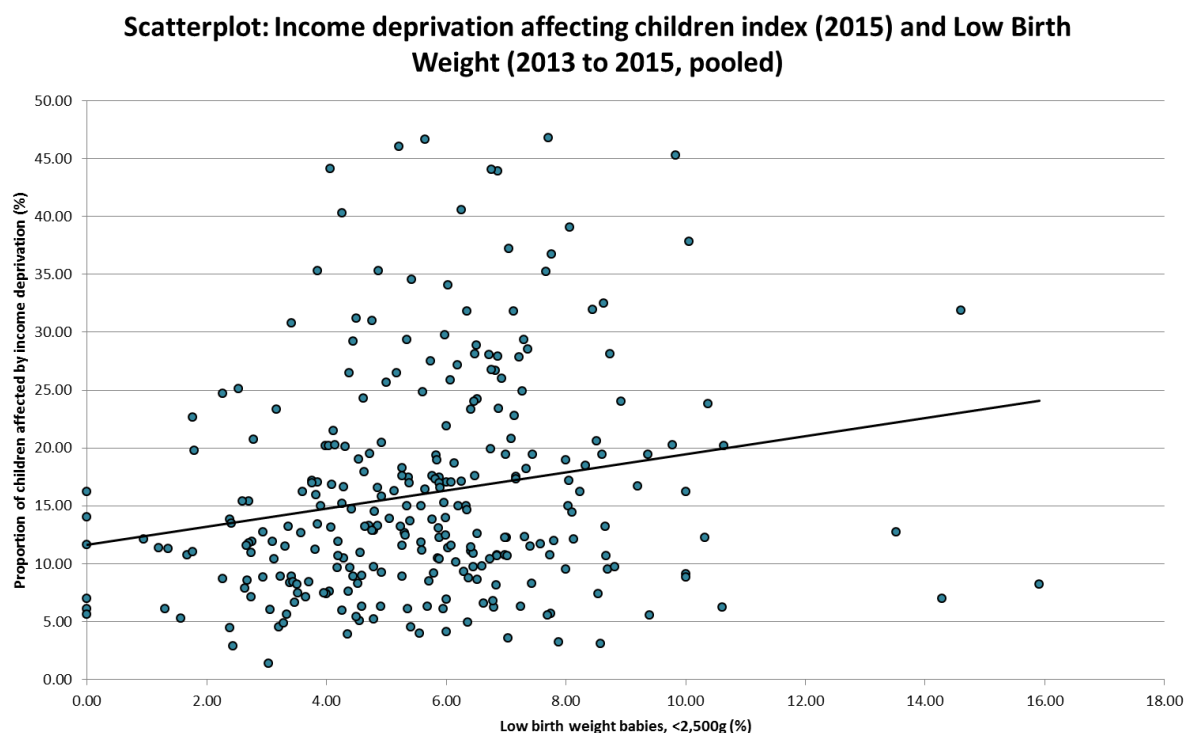
3.4.2 Recording

Births with either a missing birthweight or invalid birthweight (0g) are excluded from analysis. The proportion of records with either a missing birthweight or invalid birthweight differed significantly across the Kent CCGs and Trusts at which Kent mothers gave birth.

Maternity needs assessment, March 2017

Thanet (0.41%) and West Kent (0.41%) CCGs had a significantly lower proportion of unrecorded or invalid birthweights than Kent (1.04%), while Swale (4.50%) had a significantly higher proportion.

Babies born with an invalid or unrecorded birth weight 2013 to 2015 (pooled)

Source: PHBF, prepared by KPHO (ES), 12/16

Maternity needs assessment, March 2017
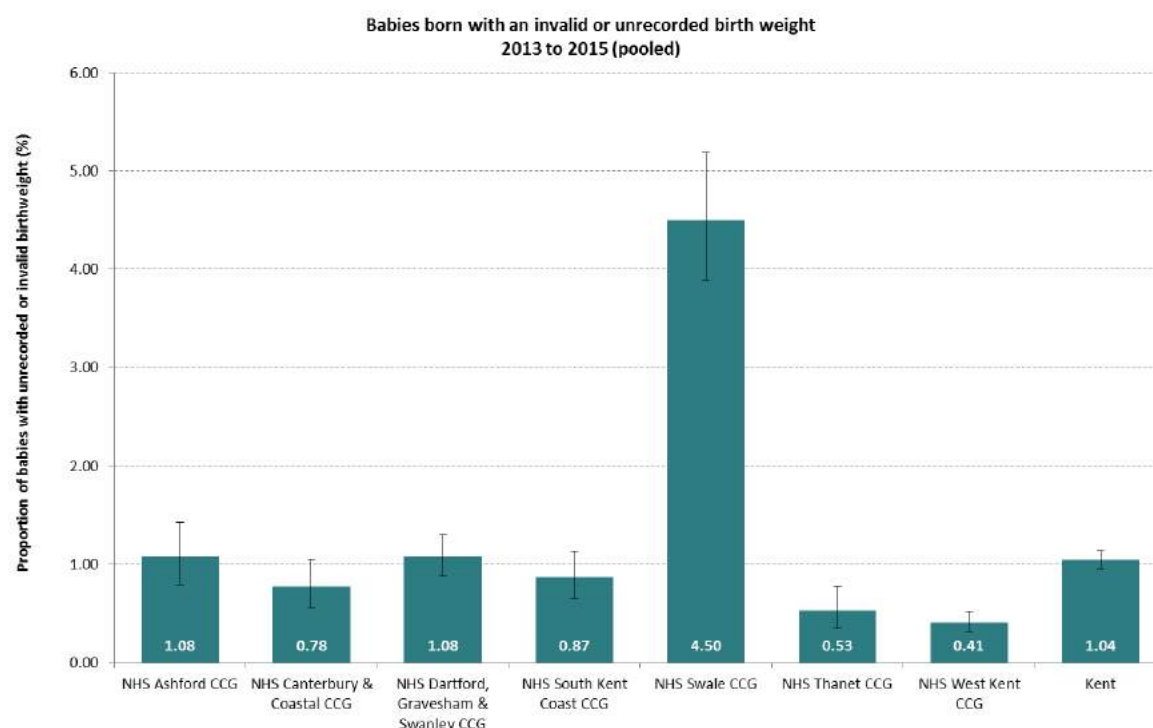
By Trust, Medway (5.42%) and babies born outside of Kent (3.81%) were significantly more likely to have an unrecorded or invalid birthweight than Kent mothers (1.04%). Dartford and Gravesham NHS Trust (0.68%), EKHUFT (0.74%) and MTW (0.11%) have a significantly lower proportion than Kent.

Babies born with an invalid or unrecorded birth weight
2013 to 2015 (pooled)
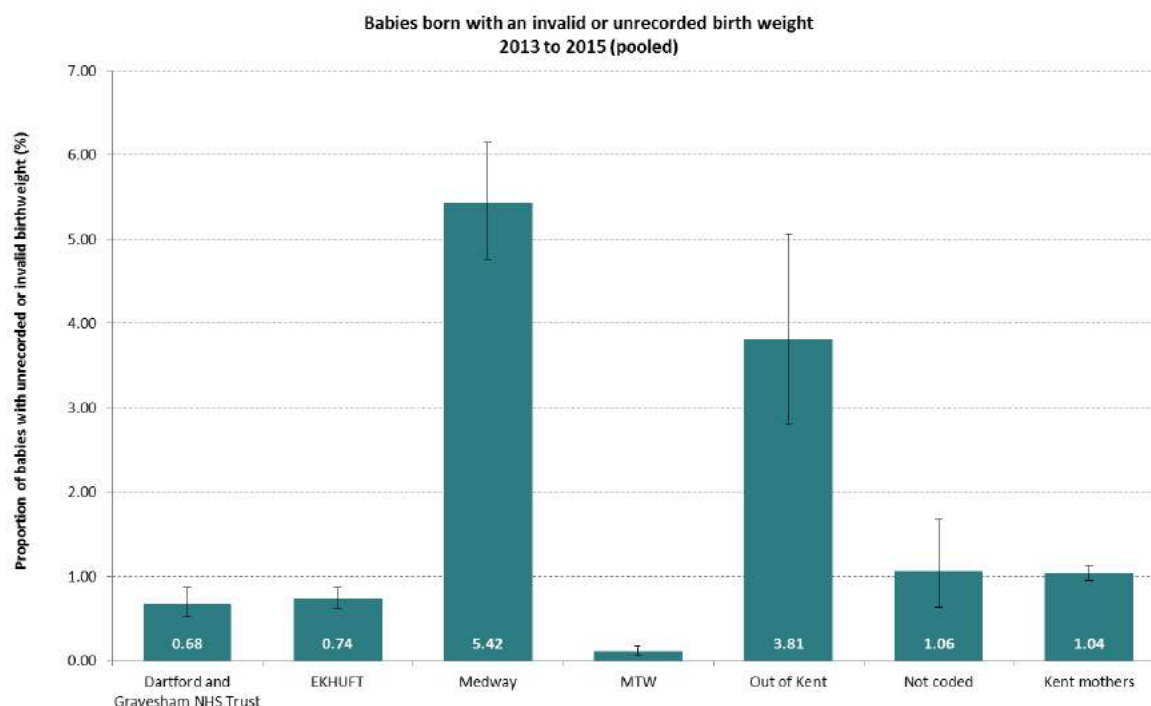
Source: PHBF, prepared by KPHO (ES), 12/16

The higher rate of unrecorded and invalid birth weights within MFT and Swale CCG (where women are likely to give birth at MFT), may at least partially explain the significantly lower proportion of low birth weight babies born to women living in Swale CCG. Although rate of data recording has only been specifically looked at for birth weight data, it is possible this represents a wider problem with quality of data recording from MFT.

Maternity needs assessment, March 2017

3.5 Age profile of mothers

The chart below shows the proportion of mothers in each age band by CCG. Across Kent, less than 5% of mothers are aged below 20 or 40 and above. Canterbury and Coastal CCG and West Kent CCGs have the highest proportion of mothers in the 30 to 34 age band, whereas the other CCGs have the highest proportion in the 25 to 29 age band.
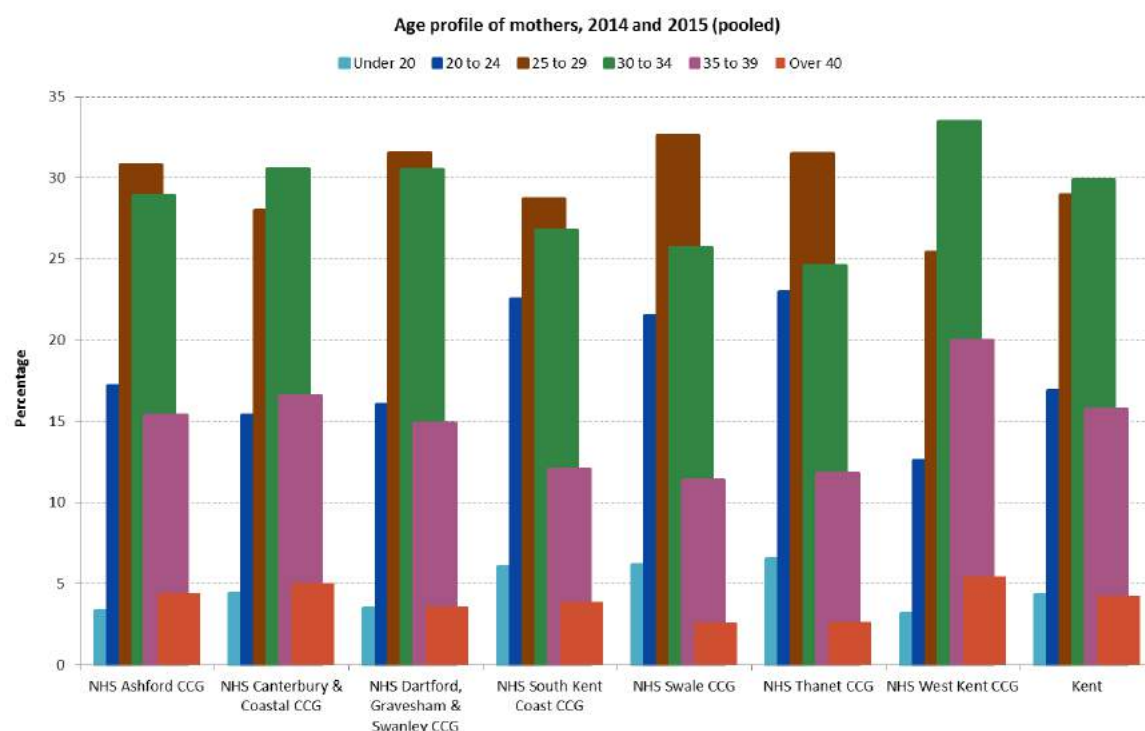
Age profile of mothers, 2014 and 2015 (pooled)

Source: PHBF, prepared by KPHO (ES), 09/16

Maternity needs assessment, March 2017

Across Kent, less than 5% of mothers are aged below 20 or 40 and above. Dartford and Gravesham, EKHUFT and Medway trusts have a younger age profile of mothers than the other trusts.

Source: PHBF, prepared by KPHO (ES), 11/16

Maternity needs assessment, March 2017
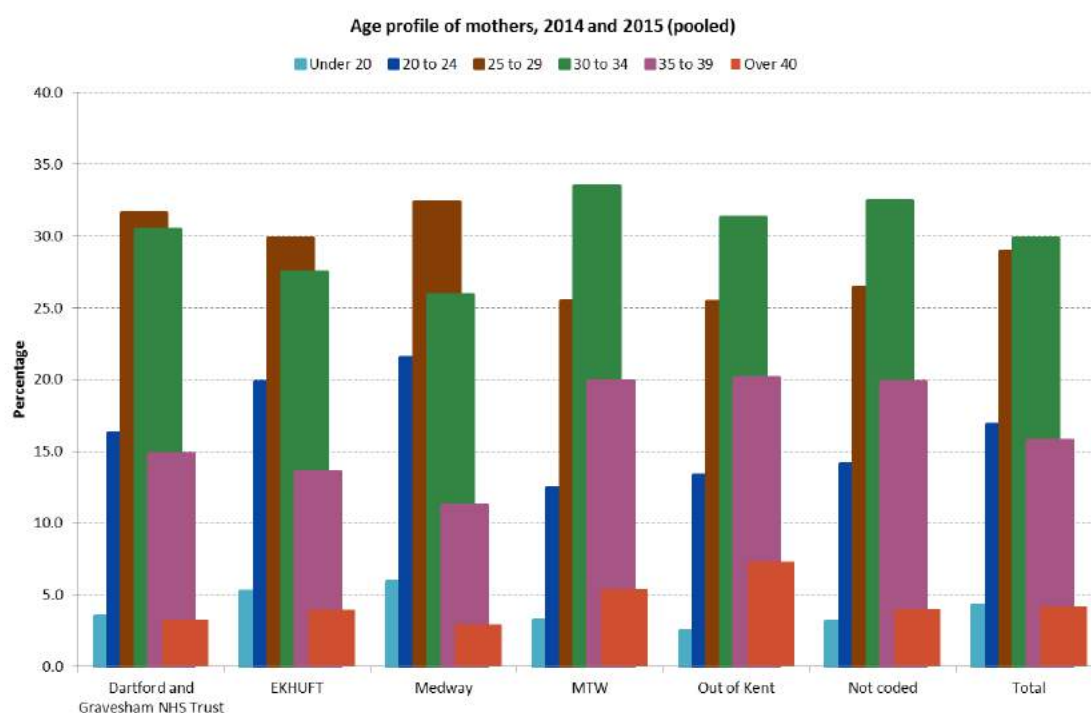
3.5.1 Teenage mothers

Across Kent in 2015, 1.10% of mothers were aged under 18 years, varying across CCGs, from 0.70% in West Kent CCG to 1.93% in South Kent Coast CCG. South Kent CCG had a rate significantly higher than Kent. EKHUFT (1.5%) and Medway (1.3%) Trusts have higher proportions of births to mothers aged under 18. None of the trusts are significantly different to Kent mothers as a whole.

Teenage mothers, 2015

Source: PHBF, prepared by KPHO (ES), 09/16

Maternity needs assessment, March 2017

Teenage mothers, 2015

Source: PHBF, prepared by KPHO (ES), 11/16

Maternity needs assessment, March 2017
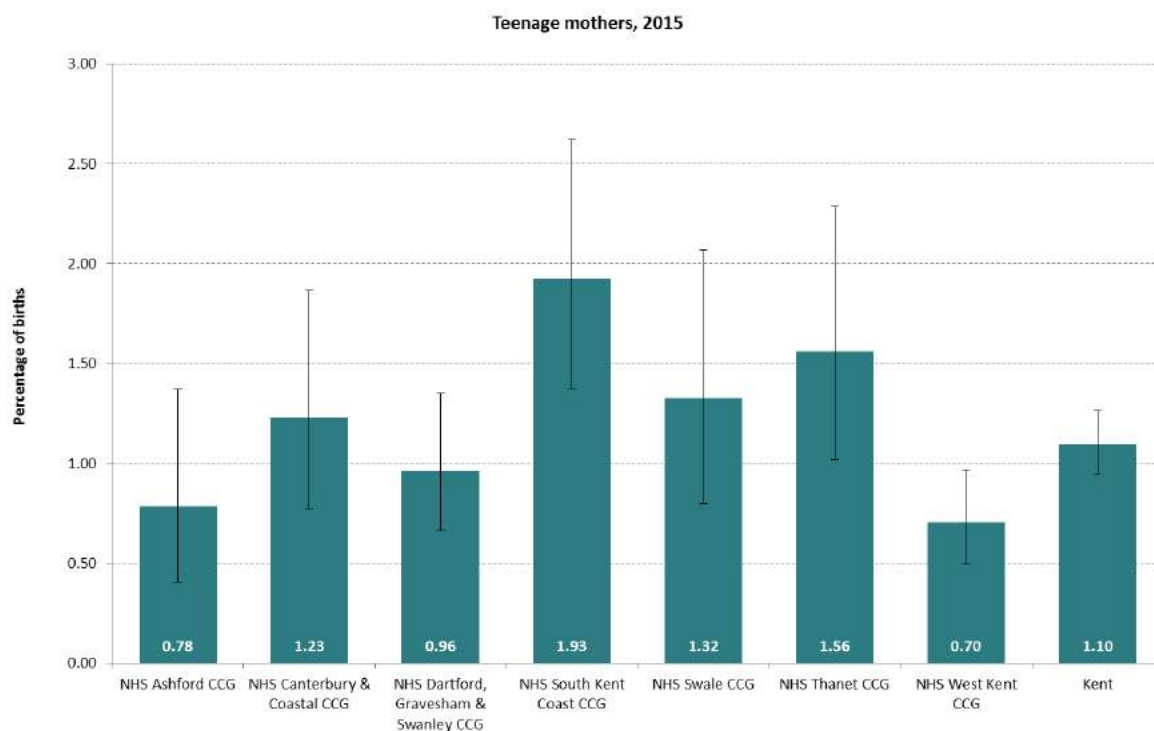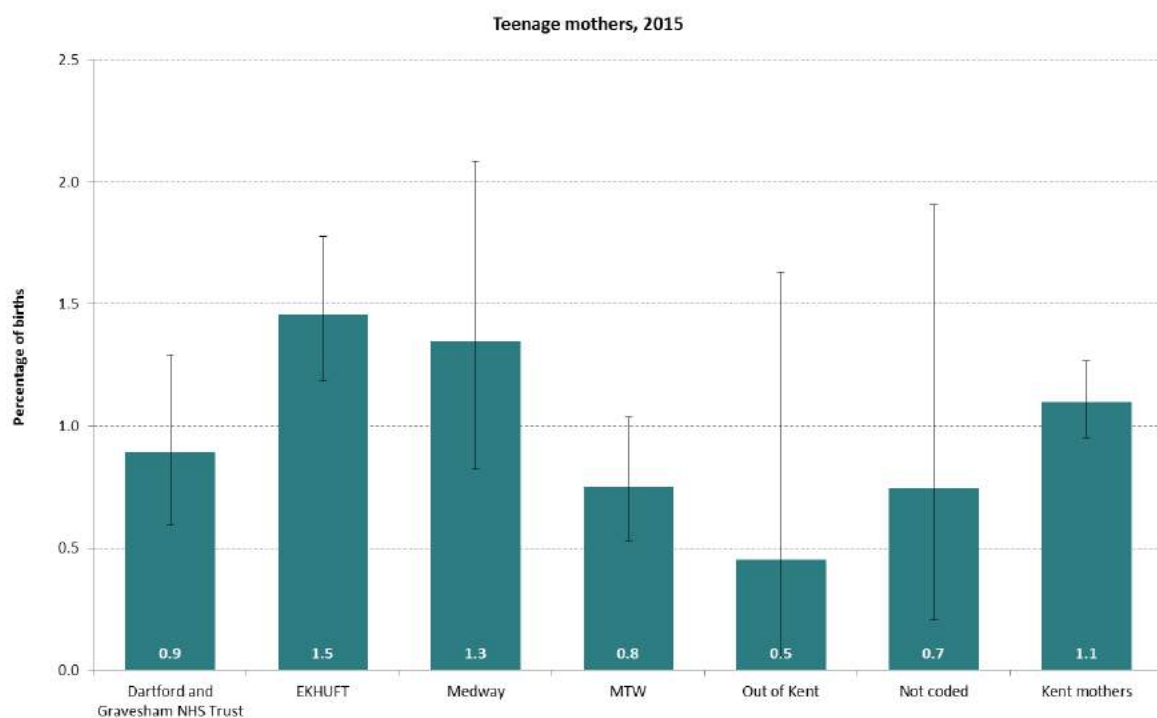
In 2015, there were 23 births with a mother aged under 16, accounting for 0.13% of births. The percentage of births to mothers aged under 16 varied according to CCG, from 0.0% in Ashford, to 0.36% (6 births) in Thanet. No babies from Kent mothers aged under 16 were born in trusts outside Kent, while in EKHUFT, 0.2% of births were to mothers aged under 16. None of the CCGs or trusts had a percentage that was significantly different to that of Kent.

Mothers aged under 16, 2015

Source: PHBF, prepared by KPHO (ES), 11/16

Mothers aged under 16, 2015

Source: PHBF, prepared by KPHO (ES), 11/16

Maternity needs assessment, March 2017
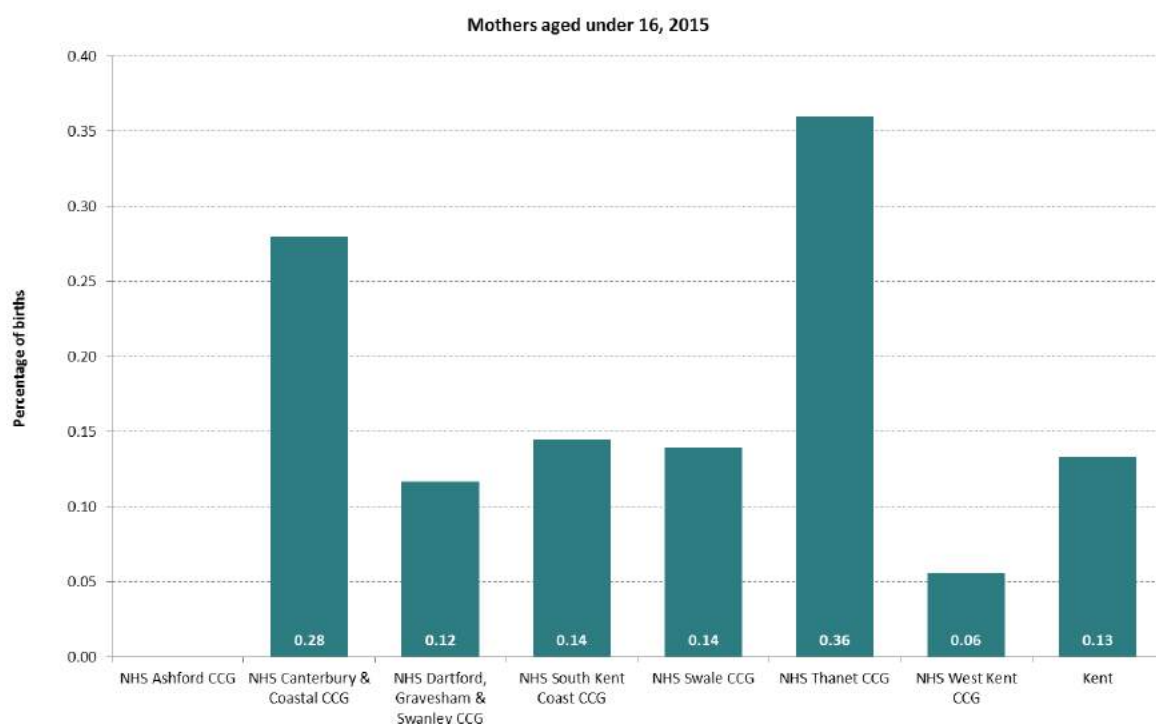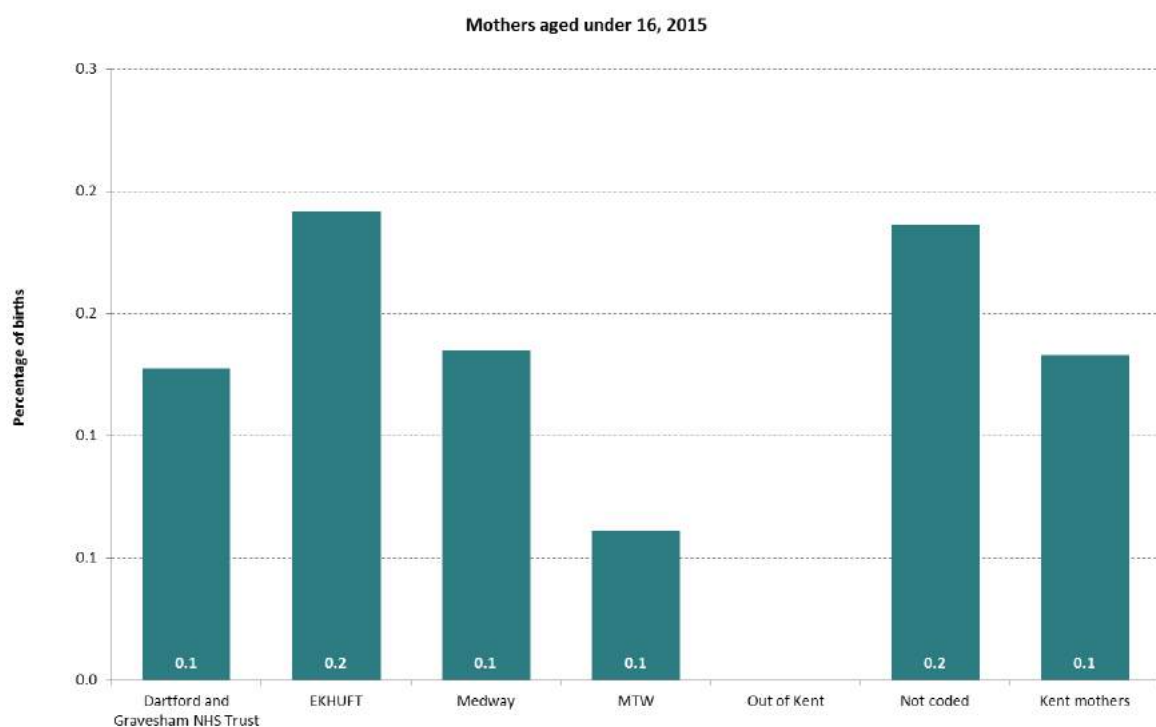
3.5.2 Mothers aged under 20

The percentage of mothers aged under 20 in 2015 across Kent was 4.04%, ranging from 2.88% in Ashford CCG to 5.85% in South Kent Coast CCG. South Kent Coast, Swale (5.72%) and Thanet (5.82%) CCGs all had significantly higher percentages than Kent, while West Kent CCG (3.06%) had a significantly lower percentage. EKHUFT (4.9%) and Medway (5.8%) trusts have a significantly higher proportion of births to mothers aged under 20, while MTW (3.1%) has a significantly lower percentage.

Mothers aged under 20, 2015

Source: PHBF, prepared by KPHO (ES), 09/16

Maternity needs assessment, March 2017

Mothers aged under 20, 2015

Source: PHBF, prepared by KPHO (ES), 11/16

Maternity needs assessment, March 2017
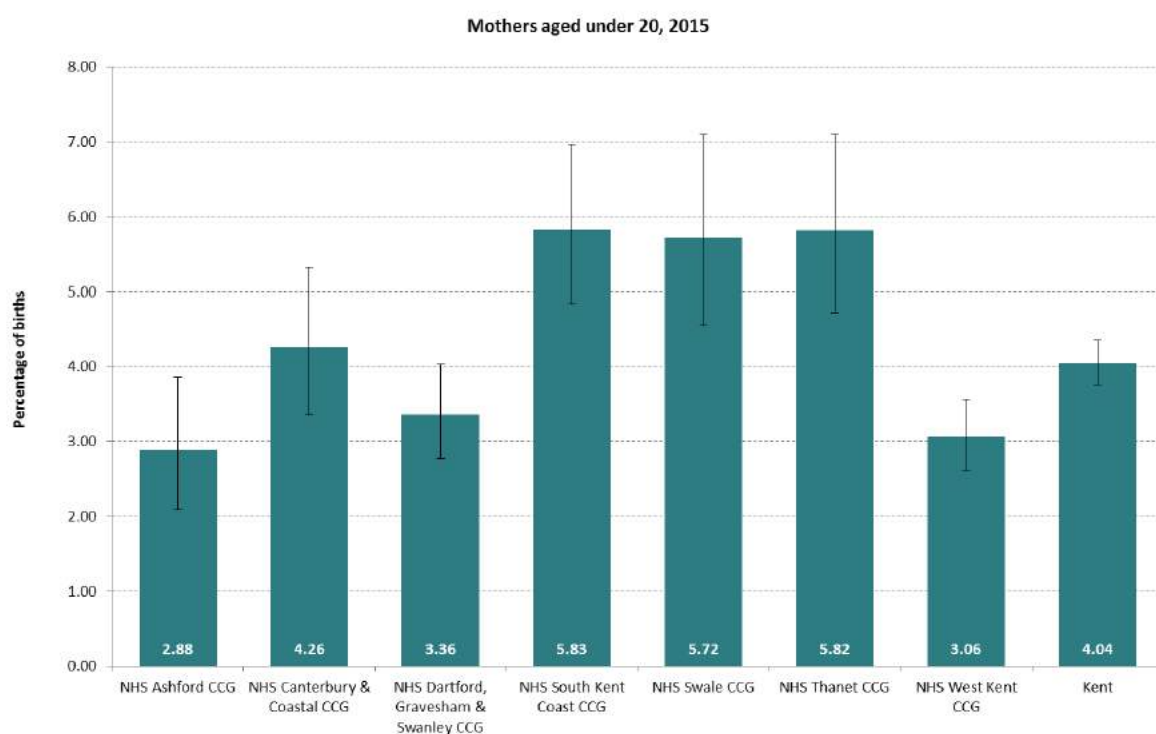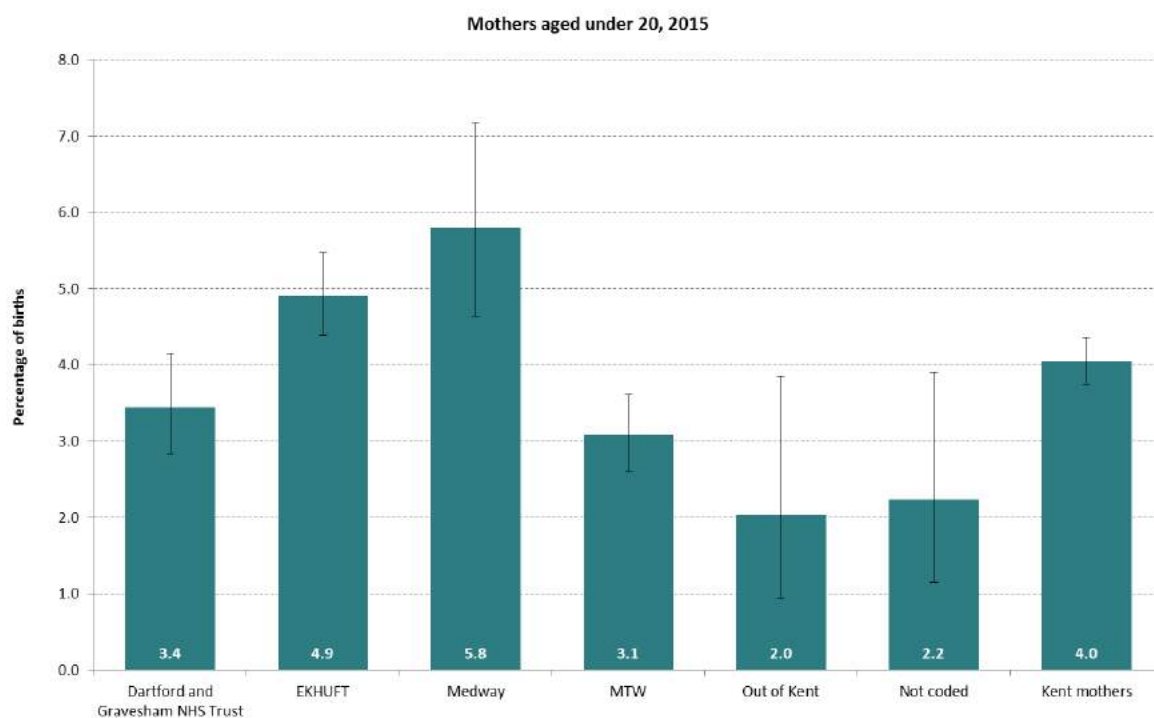
3.5.3 Mothers aged 40 and above

Across Kent, 4.06% of mothers were aged 40 and above. This percentage was highest in West Kent CCG (5.03%), significantly higher than the Kent figure. Swale CCG had the lowest proportion of mothers aged 40 and above, at 2.58%, and along with Thanet (2.70%) was significantly lower than Kent. MTW (5.0%) and trusts outside of Kent (8.4%) have a significantly higher proportion of mothers aged 40 and above.

Mothers aged 40 and over, 2015

Source: PHBF, prepared by KPHO (ES), 09/16

Maternity needs assessment, March 2017

Mothers aged 40 and over, 2015

Source: PHBF, prepared by KPHO (ES), 11/16

Maternity needs assessment, March 2017
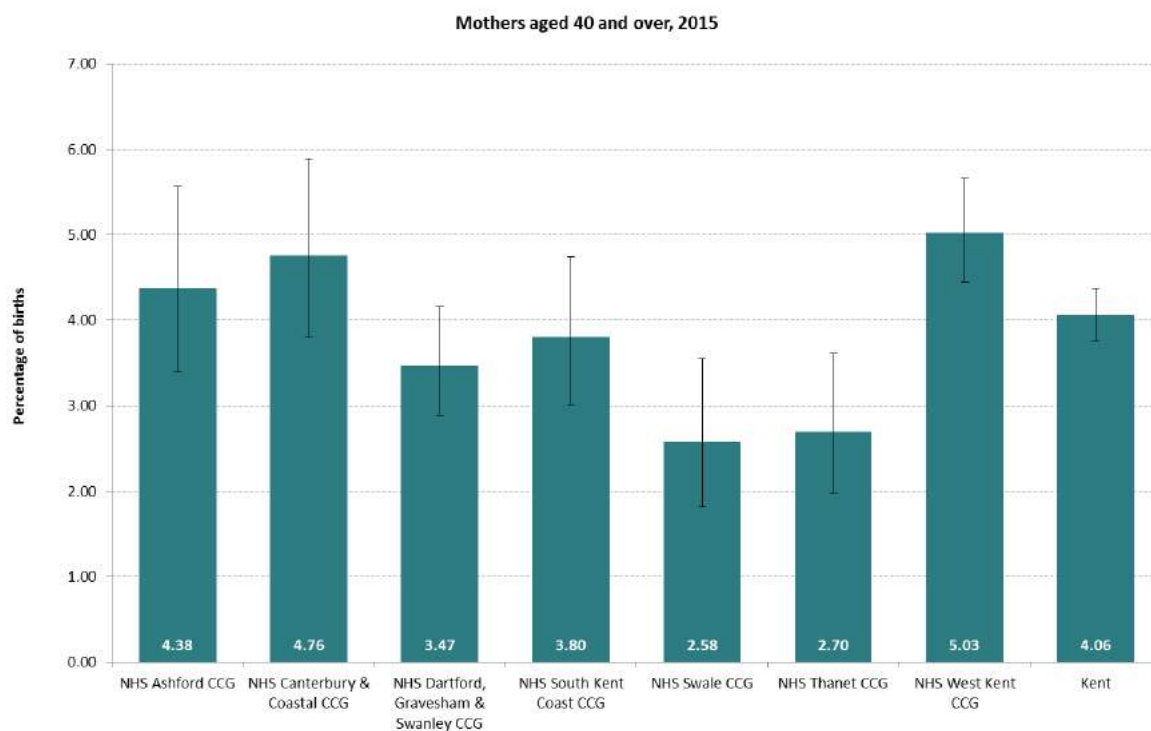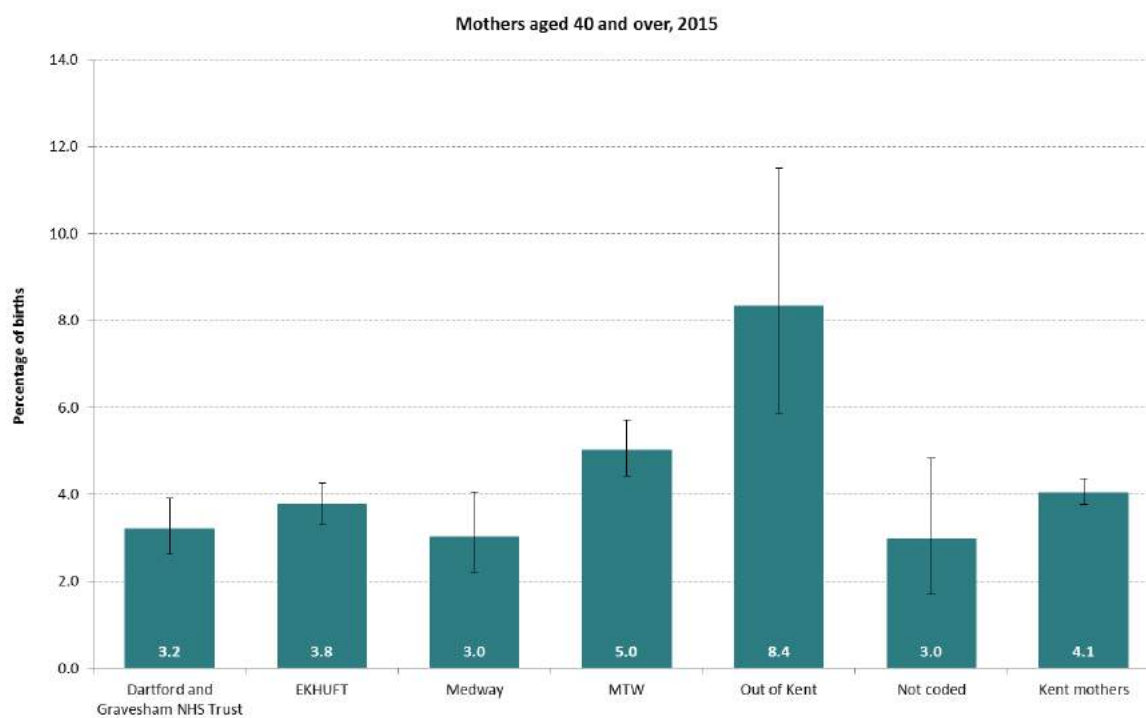
In 2015, there were 61 births with a mother aged 45 and above, accounting for 0.35% of births. The percentage of births to mothers aged 45 and above varied according to CCG, from 0.07% in Swale CCG (<5 births, number suppressed), to 0.45% (24 births) in West Kent CCG. None of the CCGs had a percentage that was significantly different to that of Kent. The percentage of babies born to mothers aged 45 and above is substantially higher in trusts outside of Kent (1.6%); however, this is not significantly different to all Kent mothers.

Mothers aged 45 and over, 2015

Source: PHBF, prepared by KPHO (ES), 11/16

Maternity needs assessment, March 2017

Mothers aged 45 and over, 2015

Source: PHBF, prepared by KPHO (ES), 11/16

Maternity needs assessment, March 2017
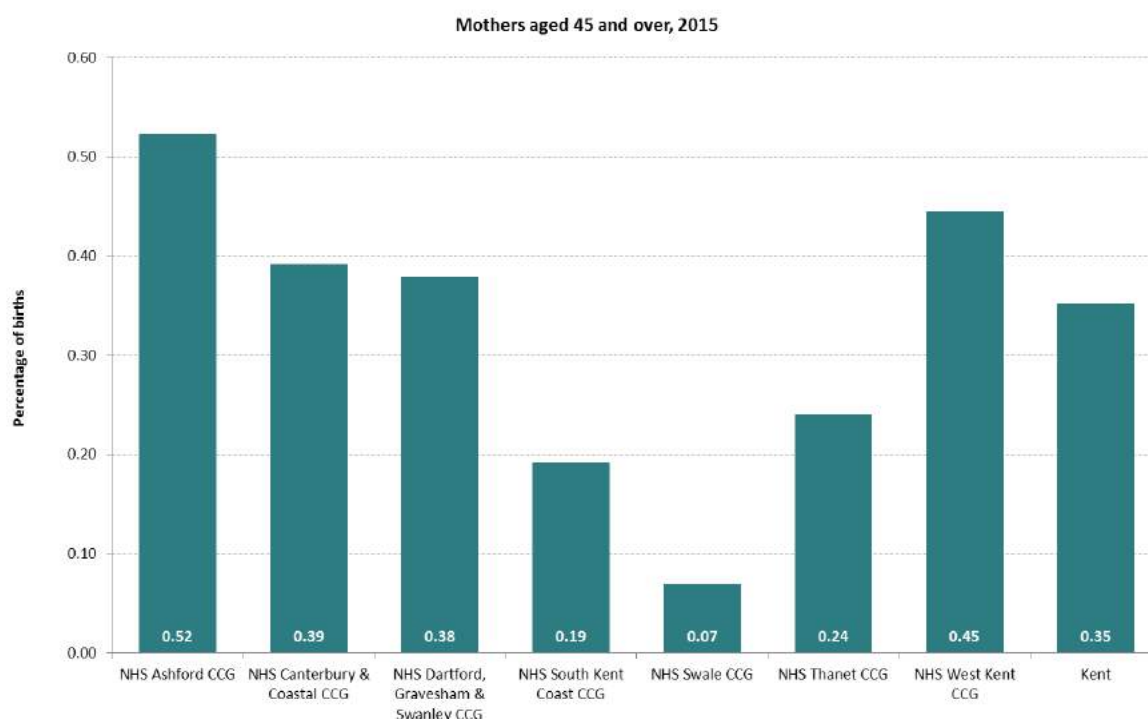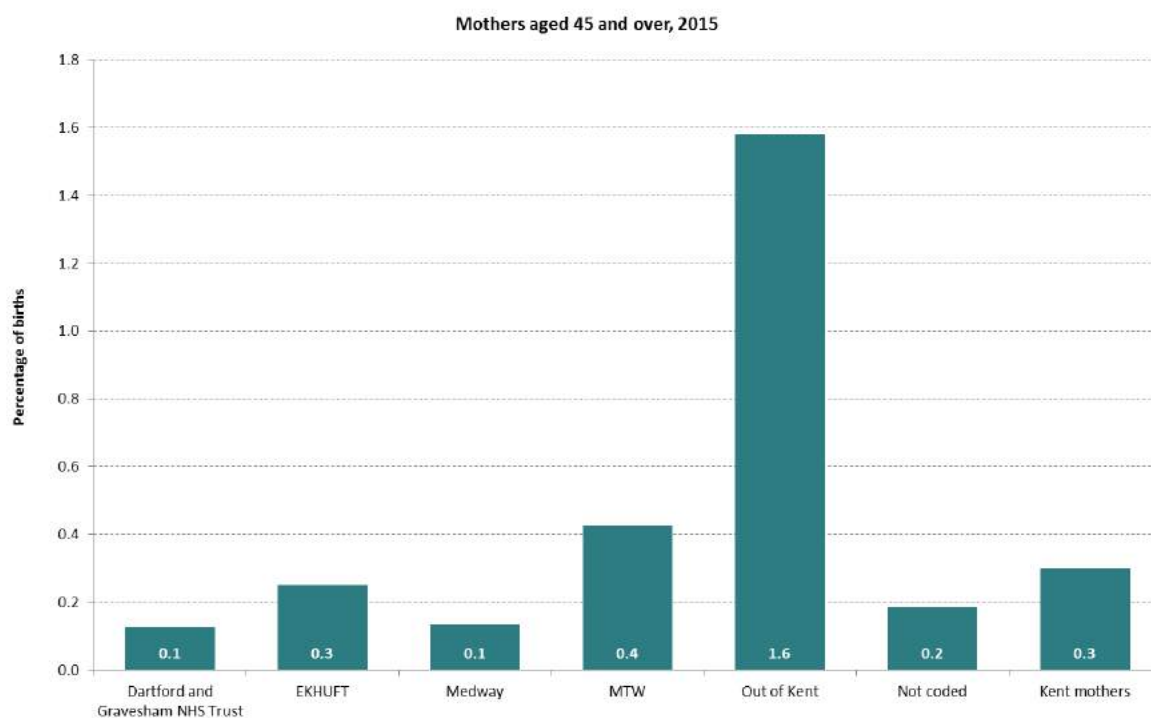
3.6 Mother's country of birth

Four fifths of mothers who gave birth in 2015 were born in England, accounting for 13,734 births of the 17,234 in 2015. Where less than 50 mothers were born in a particular country, these countries have been grouped into other. Poland is the most represented country outside of England, accounting for 2.73% of mothers.

Mother's country of birth, 2015

Country	Percentage
POLAND	2.73
INDIA	1.07
NIGERIA	1.03
LITHUANIA	0.84
ROMANIA	0.77
SLOVAKIA	0.74
SCOTLAND	0.70
SOUTH AFRICA	0.67
LATVIA	0.67
GERMANY	0.60
BULGARIA	0.48
NEPAL	0.45
WALES	0.44
SRI LANKA	0.40
CZECH REPUBLIC	0.39
ZIMBABWE	0.38
IRELAND	0.37
BANGLADESH	0.34
UNITED STATES OF AMERICA	0.34
TURKEY	0.31
PAKISTAN	0.31
NORTHERN IRELAND	0.30
AFGHANISTAN	0.29
Other	5.69

79.69% of Kent mothers who gave birth in 2015, were born in England

Percentage of births

Source: PHBF, prepared by KPHO (ES), 09/16

Maternity needs assessment, March 2017

The country of birth of mother varied across CCGs in 2015, with Dartford, Gravesham and Swanley CCG having the most diverse mothers in terms of country of birth; 26.69% of mothers were born outside of England. A fifth of mothers in Thanet (20.22%) and West Kent CCG (20.56%) were born outside of England. In Dartford, Gravesham and Swanley CCG, there were relatively higher proportions of mothers born in Poland, India and Nigeria. Thanet CCG had relatively high percentages of mothers born in Eastern European countries; Poland (3.18%), Slovakia (1.80%), Latvia (1.86%) and Czech Republic (1.44%). In Ashford CCG (1.64%) and South Kent Coast CCG (1.35%), there were small pockets of mothers born in Nepal.

Table 3: Country of birth of mother by CCG, 2015

Country of birth of mother, 2015
Percentage of births

Country of birth of mother	NHS Ashford CCG	NHS Canterbury & Coastal CCG	NHS Dartford, Gravesham & Swanley CCG	NHS South Kent Coast CCG	NHS Swale CCG	NHS Thanet CCG	NHS West Kent CCG
POLAND	3.14	1.79	3.59	1.54	3.56	3.18	2.54
INDIA	0.98	0.73	2.92	0.39	0.49	0.66	0.59
NIGERIA	0.72	0.11	3.65	0.05	0.77	0.66	0.30
LITHUANIA	0.13	0.28	1.78	0.67	1.19	0.66	0.63
ROMANIA	0.46	1.06	1.20	0.29	0.56	0.60	0.78
SLOVAKIA	0.39	0.22	0.73	1.83	0.42	1.80	0.33
SCOTLAND	0.65	0.56	0.35	0.77	0.28	0.84	1.00
SOUTH AFRICA	0.92	0.34	0.55	0.48	0.28	0.30	1.11
LATVIA	0.20	0.22	0.67	0.53	1.19	1.86	0.50
GERMANY	0.78	0.56	0.44	0.77	0.49	0.66	0.65
BULGARIA	0.26	0.50	0.35	0.34	0.70	0.54	0.59
NEPAL	1.64	0.39	0.03	1.35	0.00	0.00	0.32
WALES	0.59	0.45	0.29	0.58	0.14	0.48	0.48
SRI LANKA	0.39	0.28	0.85	0.29	0.21	0.30	0.30
CZECH REPUBLIC	0.20	0.17	0.20	0.48	0.14	1.44	0.35
ZIMBABWE	0.20	0.22	0.64	0.24	0.21	0.18	0.46
IRELAND	0.52	0.45	0.29	0.34	0.28	0.24	0.43
UNITED STATES OF AMERICA	0.20	0.56	0.15	0.43	0.28	0.12	0.48
BANGLADESH	0.33	0.11	0.47	0.29	0.21	0.12	0.46
PAKISTAN	0.33	0.06	0.55	0.14	0.14	0.48	0.30
TURKEY	0.20	0.56	0.20	0.29	0.35	0.42	0.30
AFGHANISTAN	0.07	0.00	0.18	0.10	0.00	0.48	0.63
NORTHERN IRELAND	0.20	0.67	0.09	0.48	0.07	0.36	0.30
Other	6.41	6.72	6.51	4.04	2.23	3.84	6.73
ENGLAND	80.12	82.98	73.31	83.29	85.84	79.78	79.44

Source: PHBF, Prepared by KPHO (ES), 11/16

Dartford and Gravesham NHS trust and out of Kent trusts have the most diverse country of birth of mothers, with 26.79% and 26.19% of mothers born outside of England respectively. Within DGS NHS trust, over 3% of mothers were born in Poland, India or Nigeria. Of those giving birth in a non-Kent trust, 4.06% of mothers were born in Nigeria. Medway Trust had the smallest proportion of mothers born outside England, at 13.62%.

Table 4: Country of birth of mother, by Trust, 2015.

Country of birth of mother, 2015
Percentage of births

Country of birth of mother	Dartford and Gravesham NHS Trust	EKHUFT	Medway	MTW	Out of Kent	Not coded
POLAND	3.48	2.42	3.30	2.76	2.48	1.30
INDIA	3.00	0.66	0.74	0.61	0.68	0.56
NIGERIA	3.35	0.38	0.61	0.30	4.06	0.74
LITHUANIA	1.88	0.47	0.94	0.71	0.45	0.37
ROMANIA	1.31	0.65	0.61	0.77	0.23	0.00
SLOVAKIA	0.73	1.13	0.40	0.37	0.00	0.56
SCOTLAND	0.35	0.71	0.34	0.99	0.90	0.56
SOUTH AFRICA	0.64	0.47	0.13	1.16	0.90	0.56
LATVIA	0.77	0.72	1.08	0.53	0.00	0.19
GERMANY	0.45	0.66	0.61	0.69	0.00	0.74
BULGARIA	0.38	0.41	0.61	0.65	0.23	0.19
NEPAL	0.03	0.88	0.00	0.35	0.00	0.00
WALES	0.35	0.50	0.07	0.53	0.00	0.56
SRI LANKA	0.86	0.32	0.20	0.30	0.23	0.37
CZECH REPUBLIC	0.19	0.59	0.00	0.37	0.68	0.19
ZIMBABWE	0.61	0.19	0.07	0.47	1.35	0.56
IRELAND	0.26	0.40	0.27	0.39	0.90	0.37
BANGLADESH	0.51	0.22	0.20	0.47	0.23	0.19
UNITED STATES OF AMERICA	0.16	0.28	0.27	0.45	0.68	1.12
PAKISTAN	0.61	0.25	0.13	0.32	0.00	0.00
TURKEY	0.22	0.38	0.34	0.32	0.00	0.00
AFGHANISTAN	0.19	0.16	0.00	0.69	0.00	0.00
NORTHERN IRELAND	0.10	0.44	0.07	0.28	0.45	0.19
Other	6.38	5.11	2.63	6.64	11.74	3.54
ENGLAND	73.21	81.56	86.38	78.89	73.81	87.15

Source: PHBF, Prepared by KPHO (ES), 11/16

3.7 Deprivation profile of mothers

The chart below shows the general fertility rate across Kent deprivation deciles. The general fertility rate in the most deprived Kent decile for 2011 to 2015 (pooled) was 83.23 and decreased across deciles to 47.83 in the least deprived decile.

General fertility rate by deprivation decile, 2011 to 2015 (pooled)
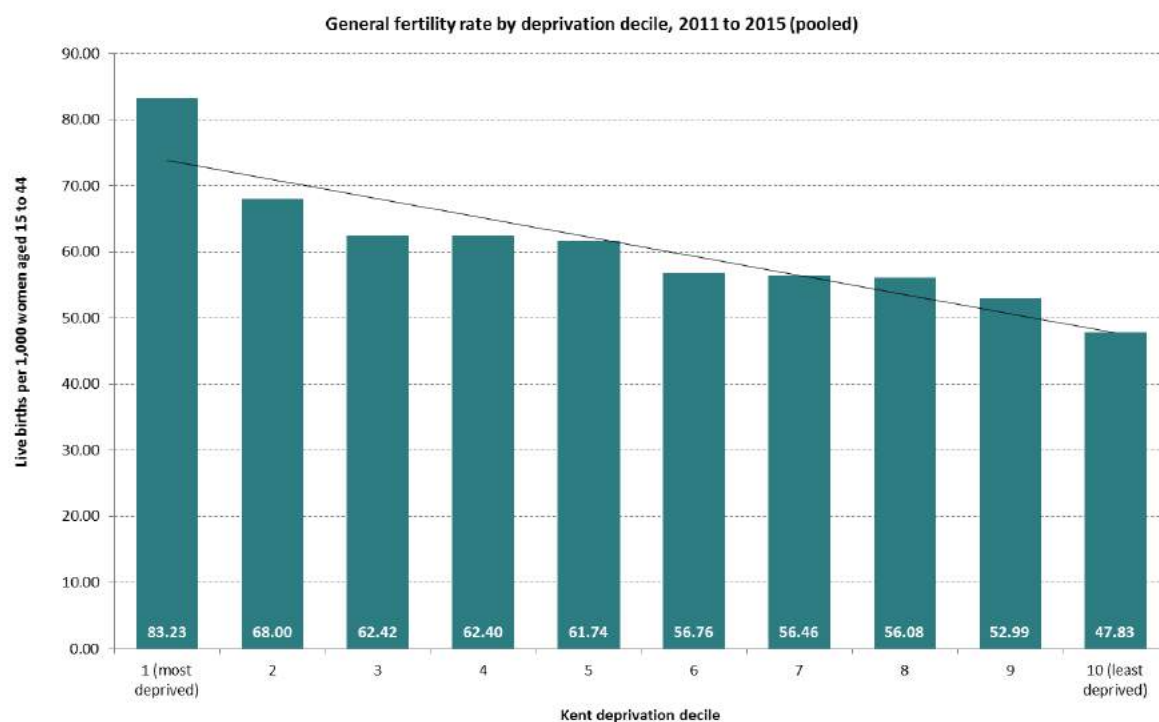
Source: PHBF, IMD 2015 (DCLG), prepared by KPHO (ES), 09/16

Maternity needs assessment, March 2017

3.8 Mortality

3.8.1 Stillbirths

The proportions of stillbirths remain relatively low across Kent at 0.44% (77 stillbirths) in 2015, and decreased notably from 0.61% (107 stillbirths) in 2010 to 0.36% (65 still births in 2010). Since then, the proportion has increased slightly; however, remains markedly lower than 2010.

Table 5: the number of still births by CCG (2010 to 2015)

CCG	2010	2011	2012	2013	2014	2015
NHS Ashford CCG	8	5	13	*	8	8
NHS Canterbury & Coastal CCG	14	7	*	8	8	7
NHS Dartford, Gravesham & Swanley CCG	21	24	14	14	18	21
NHS South Kent Coast CCG	15	12	9	9	6	6
NHS Swale CCG	13	9	6	*	5	5
NHS Thanet CCG	9	6	*	9	8	6
NHS West Kent CCG	27	29	14	17	18	24
Kent	107	92	65	64	71	77

*Numbers <5 suppressed
Source: PHBF, prepared by: KPHO (LLY), 09/16

Table 6: the number of still births by trust (2010 to 2015)

Trust	2010	2011	2012	2013	2014	2015
Dartford and Gravesham NHS Trust	19	24	13	11	15	17
EKHUFT	45	29	28	28	32	27
Medway, out of Kent, not coded	22	12	11	11	8	12
MTW	21	27	13	14	16	21
Kent mothers	107	92	65	64	71	77

Source: PHBF, prepared by: KPHO (ES), 09/16

Maternity needs assessment, March 2017

Stillbirths, Kent

Source: PHBF, prepared by KPHO (ES), 11/16

Maternity needs assessment, March 2017
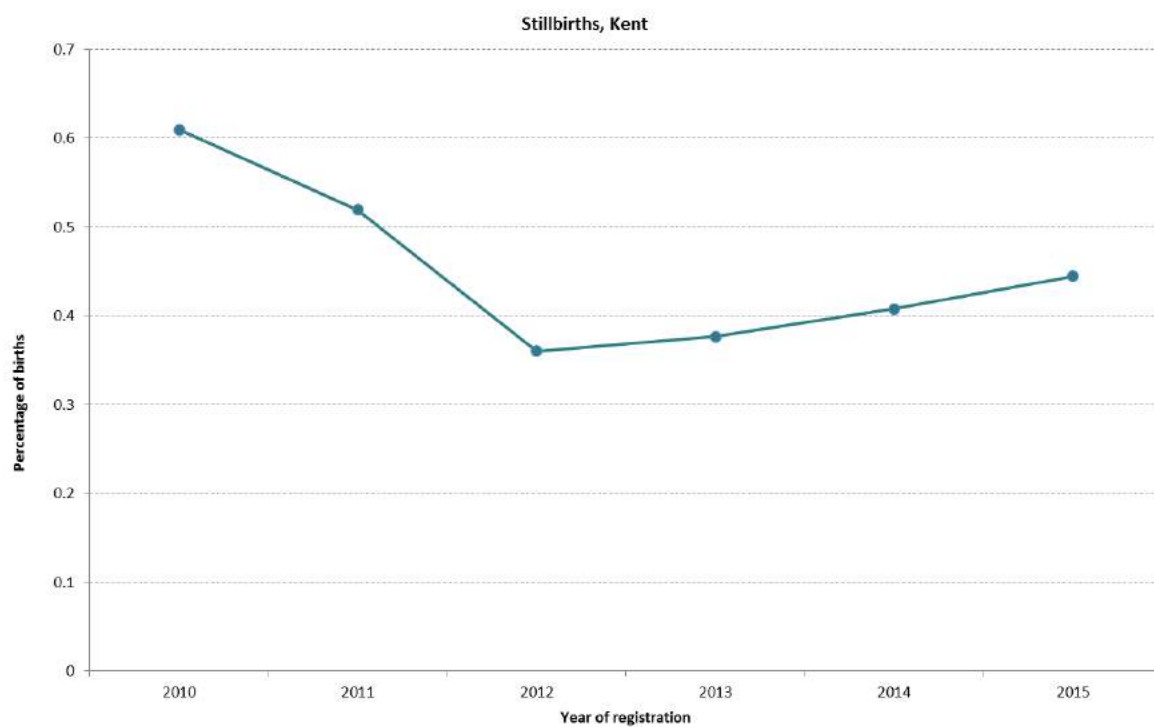
3.8.2   Perinatal mortality

Perinatal mortality rates are calculated as stillbirths plus early neonatal deaths (deaths at under 7 completed days of life) per 1,000 births. Across Kent, there were 5.70 perinatal deaths per 1,000 births, and this ranged from 4.89 in West Kent CCG to 6.85 in Dartford, Gravesham and Swanley. None of the CCGs have a rate that is significantly different to that of Kent.

Perinatal mortality, 2011-2015 (pooled)

CCG	Rate
NHS ASHFORD CCG	6.12
NHS CANTERBURY AND COASTAL CCG	5.73
NHS DARTFORD, GRAVESHAM AND SWANLEY CCG	6.85
NHS SOUTH KENT COAST CCG	6.20
NHS SWALE CCG	5.48
NHS THANET CCG	5.10
NHS WEST KENT CCG	4.89
Kent	5.70

Source: PCMD, PHBF, prepared by KPHO (ES), 09/16

Maternity needs assessment, March 2017

The Public Health Birth File (PHBF) and Primary Care Mortality Database (PCMD) were joined based on NHS number in order to assign a hospital trust to infants. Not all NHS numbers produced a match, and these were grouped into the 'not coded' category.

Perinatal mortality rates are significantly higher for babies born at a non-Kent trust (13.56) than for all Kent mothers. This would fit with the greater number of births of low birth weight babies taking place in non-Kent trusts. One possible explanation would be a greater number of premature babies being born in non-Kent trusts, however it was not possible to explore this further owing to incomplete recording of gestation. There was no significant variation between the Kent trusts in perinatal mortality.

Perinatal mortality, 2011-2015 (pooled)

Source: PCMD, PHBF, prepared by KPHO (ES), 09/16

Maternity needs assessment, March 2017
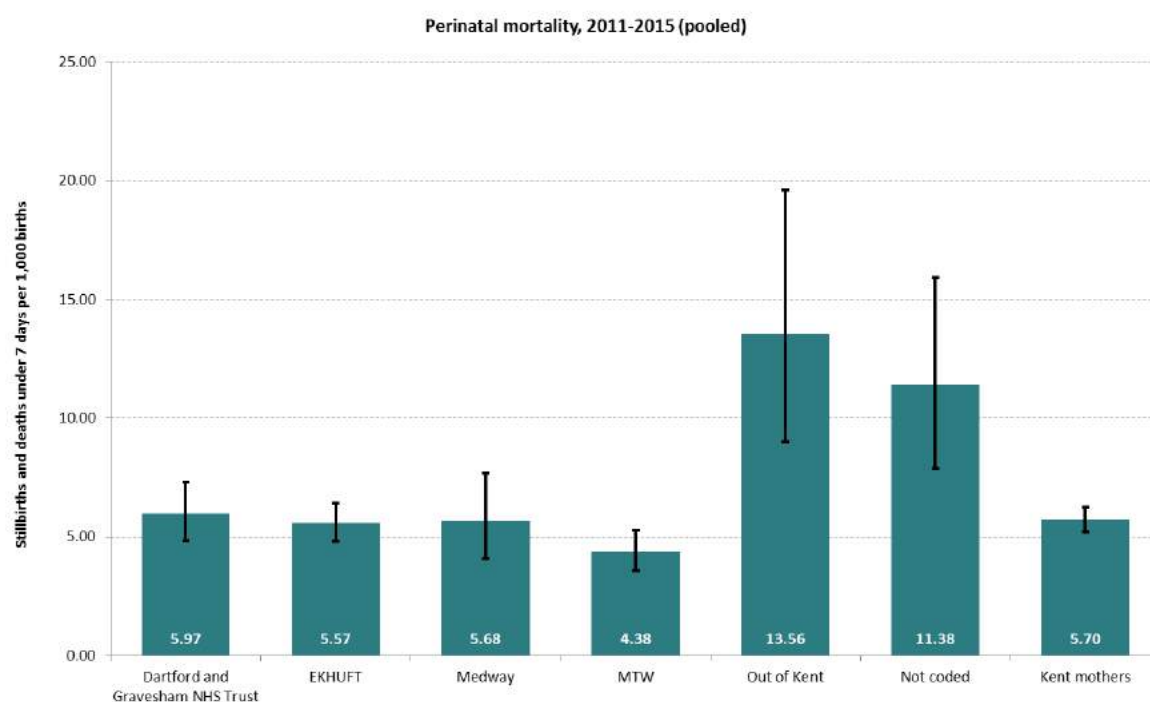
3.8.3 Neonatal mortality

Neonatal mortality rates are calculated as deaths under 28 days per 1,000 live births. Across Kent, there were 2.10 neonatal deaths per 1,000 live births, and this ranged from 1.74 in Swale CCG to 2.82 in Canterbury and Coastal CCG. None of the CCGs have a rate that is significantly different to that of Kent.

Neonatal mortality, 2011-2015 (pooled)

CCG	Rate
NHS ASHFORD CCG	1.87
NHS CANTERBURY AND COASTAL CCG	2.82
NHS DARTFORD, GRAVESHAM AND SWANLEY CCG	2.16
NHS SOUTH KENT COAST CCG	2.56
NHS SWALE CCG	1.74
NHS THANET CCG	1.95
NHS WEST KENT CCG	1.83
Kent	2.10

Source: PCMD, PHBF, prepared by KPHO (ES), 09/16

The Public Health Birth File (PHBF) and Primary Care Mortality Database (PCMD) were joined based on NHS number in order to assign a hospital trust to infants. Not all NHS numbers produced a match, and these were grouped into the 'not coded' category.
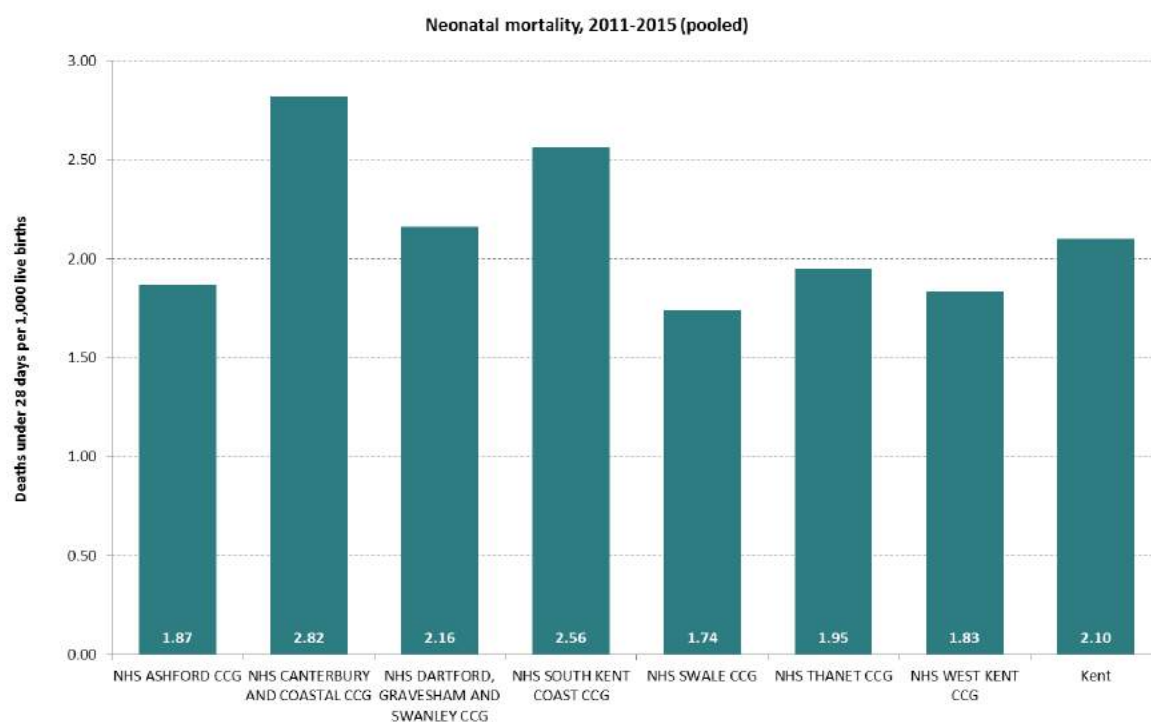
Neonatal mortality rates are significantly higher for babies born at a non-Kent trust (13.15) than for all Kent mothers. There was no significant variation between the Kent trusts and all Kent mothers in neonatal mortality.

Neonatal mortality, 2011-2015 (pooled)

Source: PCMD, PHBF, prepared by KPHO (ES), 09/16

Maternity needs assessment, March 2017
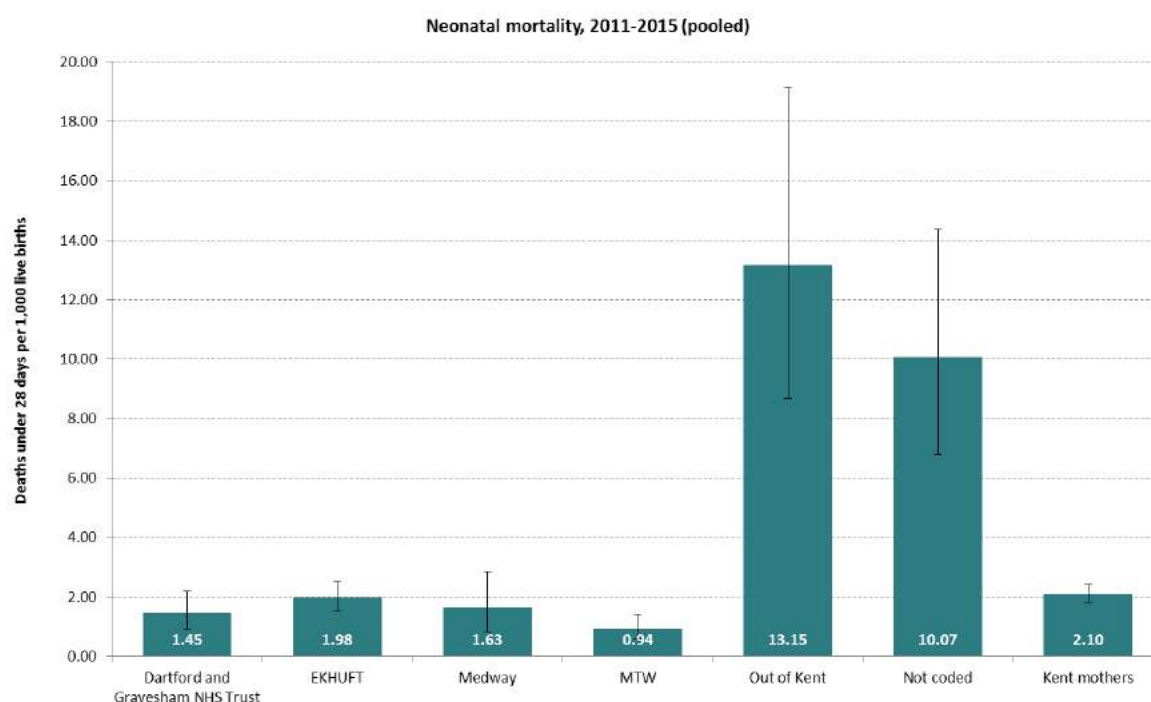
Of the 183 deaths for infants under 28 days old, a third were due to 'disorders related to short gestation and LBW, not elsewhere classified'.
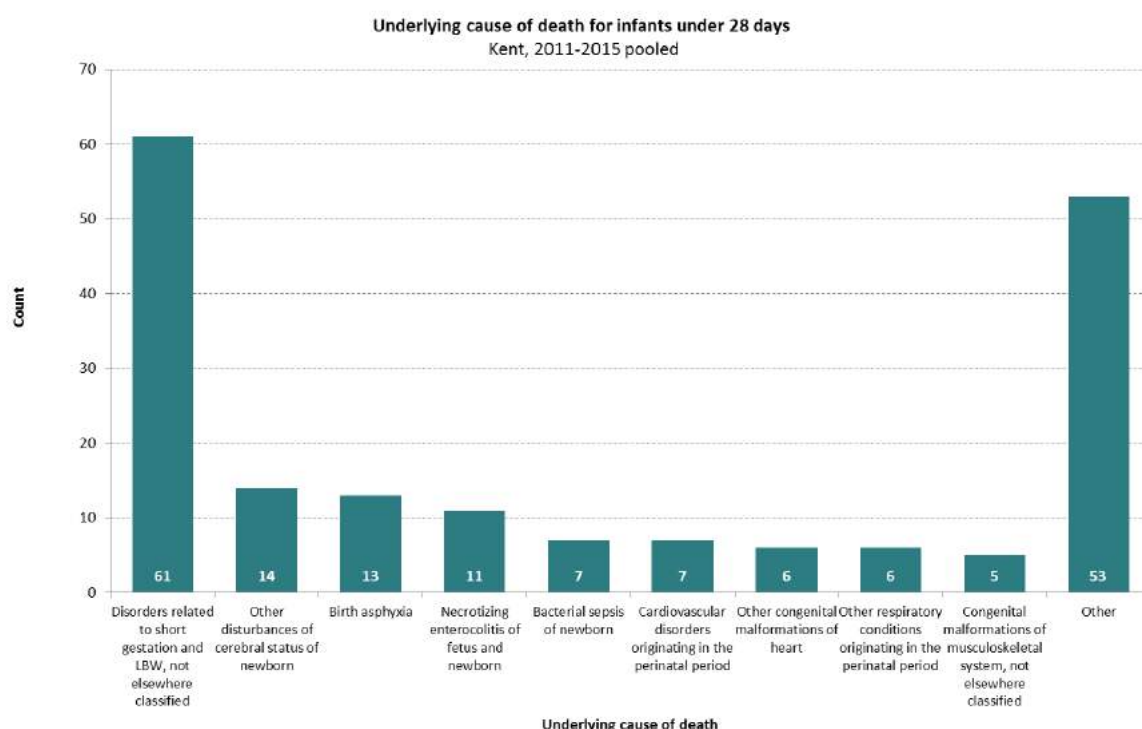
Source: PCMD, prepared by KPHO (ES), 11/16

3.8.4 Maternal mortality

Across Kent, there were 13 deaths with an underlying cause of 'pregnancy, childbirth and the puerperium' between 2006 and 2015.

3.9 Gestation

Based on 2014 and 2015 data, only 0.42% (147) of records within the PHBF have a recorded length of gestation.

3.10 Recommendations

- That maternity commissioners take into account the projected population increases, particularly as a result of housing developments in some parts of Kent, to ensure maternity services are able to cope with the likely increased demand in the future.
- That maternity commissioners work with providers to improve the quality of data recording. Analysis of birth weight data suggests this may be a particular problem at MFT.

| 4. Unhealthy Lifestyles

Data from both Euroking and the Kent Integrated Dataset (KID) have been used to investigate unhealthy lifestyles, alongside nationally published sources. A detailed account of the methodological approaches taken using each of these data sources and any data limitations are provided in Annex A.

4.1 Smoking

4.1.1 Smoking at time of delivery

Nationally, the proportion of women smoking at time of delivery has decreased over the past three years, from 11.99% in 2013/14 to 10.65% in 2015/16. While the Kent proportion decreased in 2014/15, the percentage increased to 12.98% in 2015/16, similar to the levels observed in 2013/14.

Data published by Public Health England (PHE) shows that Kent had a significantly higher percentage of mothers smoking at time of delivery than England in 2015/16, and South Kent Coast (16.81%), Swale (20.52%) and Thanet (18.97%) had significantly higher percentages than both Kent and England. Dartford, Gravesham and Swanley (10.94%) had a significantly lower percentage of mothers smoking at time of delivery than Kent, and West Kent CCG (9.66%) had a significantly lower percentage than both Kent and England.

Smoking at time of delivery
■2013/14 ■2014/15 ■2015/16

Location	%
NHS Ashford CCG	11.25
NHS Canterbury And Coastal CCG	12.15
NHS Dartford, Gravesham And Swanley CCG	10.94
NHS South Kent Coast CCG	16.81
NHS Swale CCG	20.52
NHS Thanet CCG	18.97
NHS West Kent CCG	9.66
Kent	12.98
England	10.65

Source: PHE, prepared by KPHO (ES), 11/16

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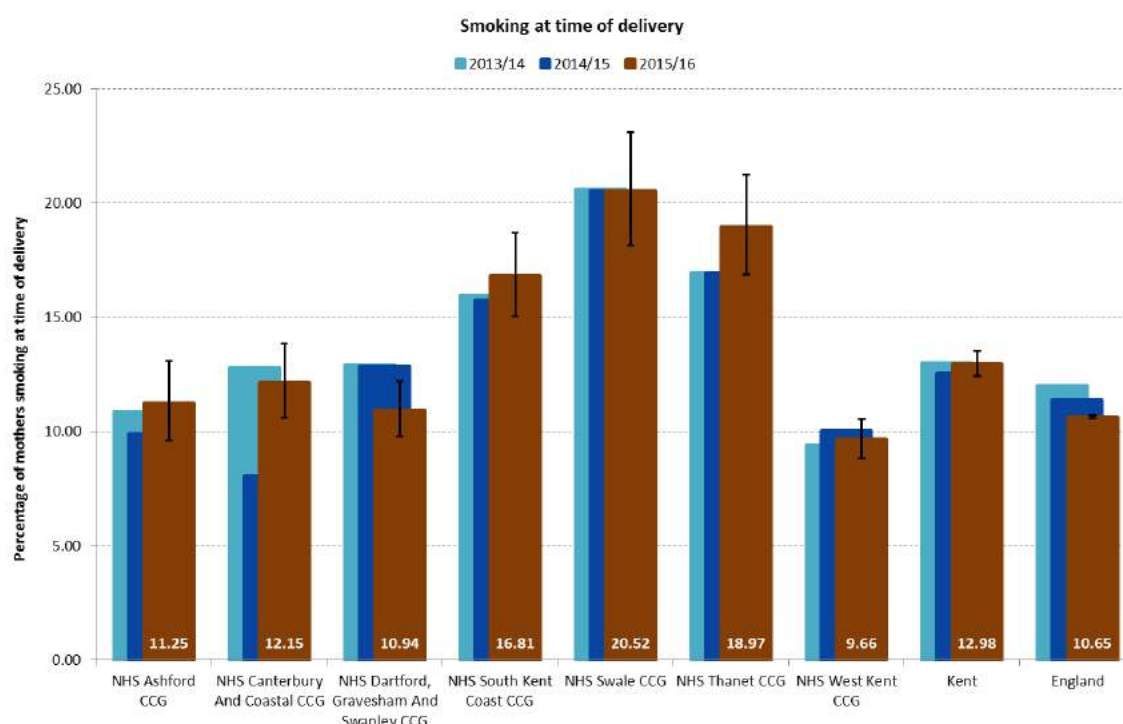
Data extracted from Euroking provides a further measure of smoking at time of delivery, although this is only available for two of the three acute trusts in Kent.

Smoking at time of delivery: by Trust
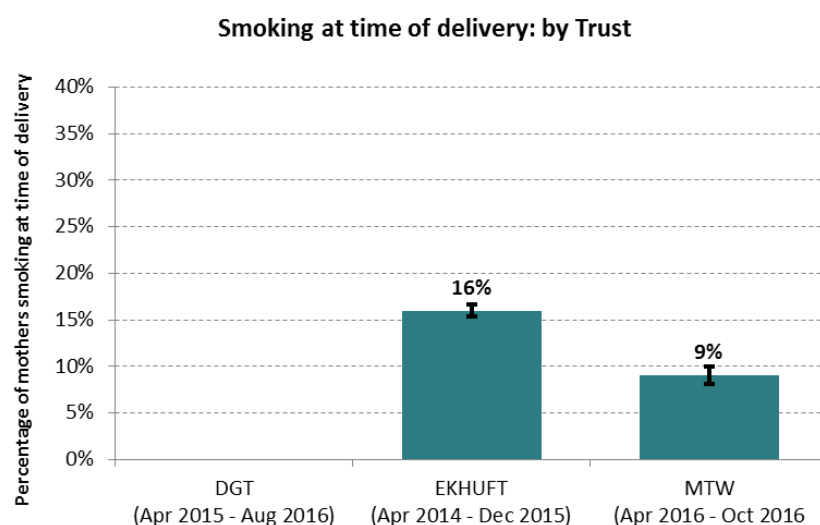
Source: Euroking, prepared by KPHO (RK), December 2016

These results are consistent with those published by Public Health England.

4.1.2   Smoking during pregnancy

Attempts have been made to look at smoking in pregnancy from the GP records included in the KID. Pregnant women recorded by their GP as being a smoker at any time prior to pregnancy, and with no subsequent record of a quit (prior to delivery) have been included as smoking during pregnancy. As the chart below illustrates, this approach produces higher figures than both Euroking and nationally published results on smoking at time of delivery. It is likely that this is caused by incomplete recording of quits on GP records.

Smoking in pregnancy estimates, based on GP records: by CCG
Mothers known to their GP as a smoker prior to pregnancy but with no record of a quit prior to delivery, 2015/16

Source: Kent Integrated Dataset, prepared by KPHO (RK), December 2016

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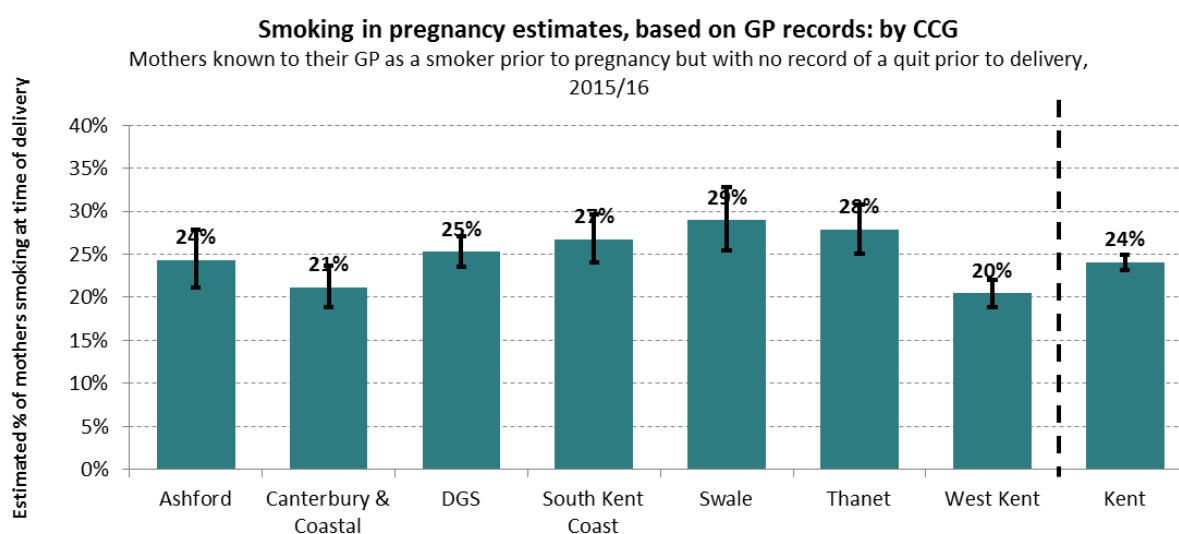
4.1.3 Smoking prior to pregnancy

No nationally published data is available on smoking prior to and/or during pregnancy. Data extracted from Euroking provides a measure of smoking prior to pregnancy for one of the three acute trusts in Kent[1].

Smoking prior to pregnancy: by Trust
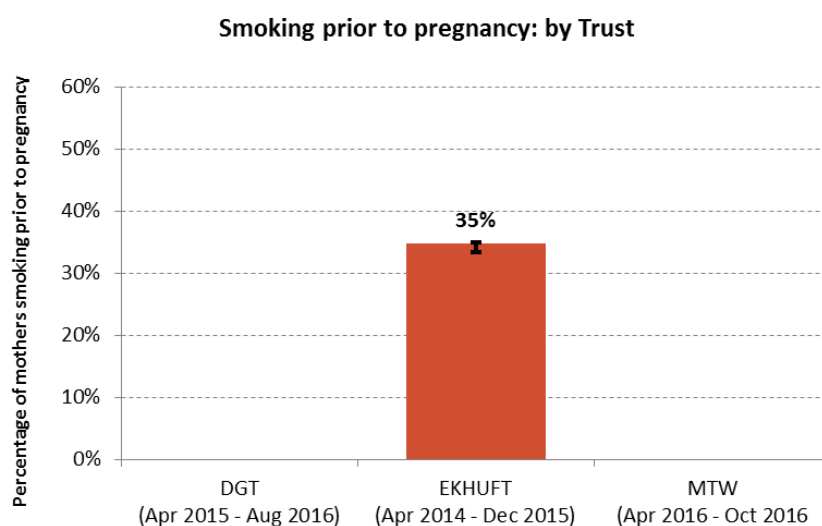
Source: Euroking, prepared by KPHO (RK), December 2016

An estimate of smoking prior to pregnancy has also been derived from the GP records included in the KID. Pregnant women recorded by their GP as being a smoker at any time prior to pregnancy have been included as having smoked prior to pregnancy. As the chart below illustrates, this approach produces figures that are broadly consistent with those extracted from Euroking for EKHUFT. Given this broad consistency, the decision was taken to utilise this measure of smoking as a variable for cross-analysis later in this report.

Smoking prior to pregnancy estimates, based on GP records: by CCG
2015/16
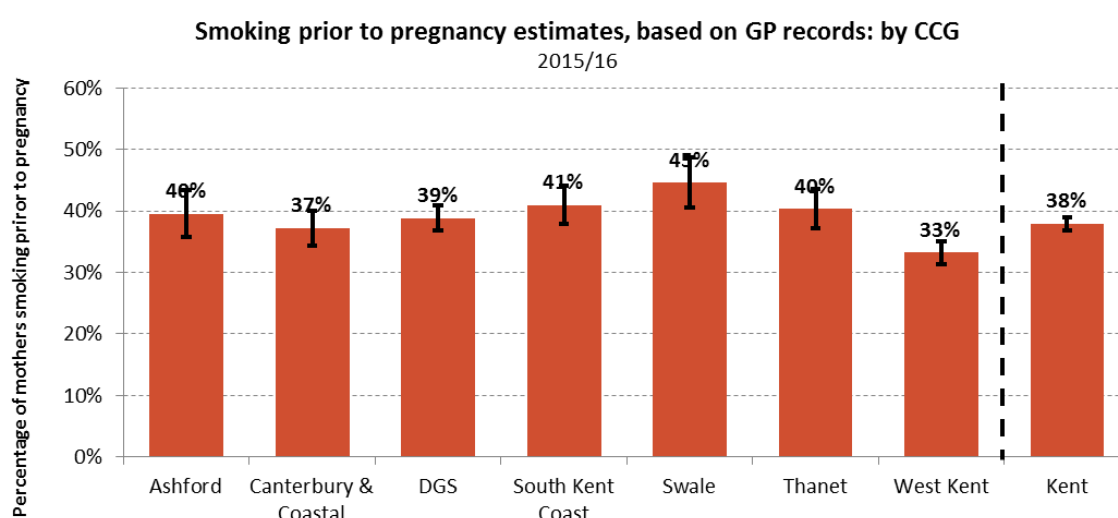
Source: Kent Integrated Dataset, prepared by KPHO (RK), December 2016

[1] Some data was provided by both DGT and MTW, but records were blank for 80% and 69% of maternities respectively.

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4.1.4 Helping pregnant women to stop smoking

NICE have reviewed the evidence on smoking in pregnancy and produced guidance (NICE, 2010). Smoking in pregnancy is associated with a wide range of problems, including complications during labour, increased risk of stillbirth, miscarriage, premature birth, low birth weight and sudden unexpected death in infancy. It also increases the risk of infant mortality by 40%. Longer term, it is also associated with an increase in wheezy illnesses during childhood, psychological problems such as attention and hyperactivity problems and disruptive and negative behaviour, and may also have an adverse impact on educational performance. Infants of parents who smoke are also more likely to suffer from serious respiratory infections, asthma and ear, nose and throat problems. In 2010, the total annual cost to the NHS of smoking during pregnancy was estimated to range between £8.1 and £64 million for treating the resulting problems for mothers and between £12 million and £23.5 million for treating infants (aged 0–12 months).

The table below is taken from the NICE costing template on quitting smoking in pregnancy and following childbirth (NICE, 2010). It shows the population attributable risk associated with maternal smoking in England (that is the percentage of cases of each condition that are attributable to smoking and therefore could be avoided if all women stopped smoking).

Table 7: Pregnancies in England, associated complications in 2008/09 and the relative risks associated with smoking.

Details	Total number	Outcomes as a % of total deliveries	Relative risk	Population attributable risk %
Total number of deliveries (pregnant women)	652,638			
Ectopic pregnancies	10,348	1.6%	1.89	7.46%
Complications on maternal outcomes				
Premature rupture of membrane	59,267	9.1%	2.30	10.54%
Placenta praevia	3,985	0.6%	2.84	14.29%
Abruption placenta	2,422	0.4%	2.62	12.80%
Pre-term delivery	34,753	5.3%	2.30	10.54%
Pre-eclampsia	12,120	1.9%	0.59	-3.86%
Infant outcomes				
Low birth weight		6.9%	2.20	9.81%

	44,766			
Respiratory distress	19,032	2.9%	2.20	9.81%
Sudden infant death syndrome (SIDS)	3,935	0.6%	4.90	26.11%

Source: NICE

A systematic review of qualitative research looking at barriers and facilitators to smoking cessation experienced by pregnant women (Flemming et al, 2015) identified four factors that could act as either barriers or facilitators to women's ability to stop smoking. These were psychological wellbeing, relationships with significant others, changing connections with her baby through and after pregnancy, and appraisal of the risk of smoking. In women from disadvantaged backgrounds these factors more often acted as barriers than facilitators. In terms of psychological wellbeing smoking was perceived by women as a way of managing stress and providing a brief opportunity for relaxation. However, smoking in pregnancy could also undermine wellbeing as a result of guilt or disapproval from others. Partners could facilitate smoking cessation by being supportive or undermine it by continuing to smoke. Some women described partners who monitored their smoking in a controlling or abusive manner. Although family and friends could be supportive, they often acted as a barrier to quitting as this could have a negative effect on women's social connections within their community. Although health professionals could facilitate quitting, half-hearted support and insufficient advice acted as a barrier. A desire to protect the baby was a motivation to quit and breastfeeding helped sustain this. However in many cases this was viewed as a temporary change with an expectation that they would start smoking again after the baby was born. Although in general an awareness of the risks associated with smoking in pregnancy was a motivator to quit, this was often moderated by women in ways that reduced the perceived magnitude of the risk. Women perceived risk as a population risk rather than a personal one. Personal experience from previous pregnancies as well as the experiences of others they knew, who had healthy children, led them to question the degree of risk. Although a widely known risk of smoking in pregnancy, low birth weight was seen by women to be an advantage as it would lead to an easier labour and delivery. Women also perceived the stress associated with a quit attempt to be equivalent to the risks associated with smoking.

Research reviewed by NICE (NICE, 2010) suggests that although nearly half (49%) of pregnant smokers give up before the birth, 30% were smoking again within one year of delivery. One in ten pregnant smokers report cutting down on the amount they smoked during pregnancy. However, studies suggest that even when women say they have cut down, their intake of toxins has not actually reduced. Pregnant women may also be exposed to second hand tobacco smoke from partners and other household members who smoke. Mothers who are advised to give up smoking in pregnancy are much more likely to do so

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than those who were only advised to cut down, with less than 1% of those advised to cut down actually trying to quit. Mothers who received mixed messages, to both stop completely and cut down, were more likely to cut down than to stop smoking.

Cost effectiveness modelling carried out by NICE (2010), as part of their guideline development, showed that interventions to encourage women who are pregnant to quit smoking are cost effective. Insufficient data for some outcomes meant that not all the effects of smoking during pregnancy were modelled, for example the model did not include the impact on subsequent infant morbidity and quality of life or healthcare costs for children aged over 5 years. If these factors had been included the interventions would have probably been even more cost effective.

NICE recommend that:

- Midwives should discuss women's exposure to tobacco smoke at first antenatal booking appointment (as well as subsequent appointments) and carry out a carbon monoxide (CO) test.
- All women who smoke (or who have stopped smoking in the last 2 weeks) or have a high CO reading of 7ppm or above should be referred to NHS stop smoking services.
- All those who are responsible for providing health and support services for pregnant women should use any appointments as an opportunity to ask pregnant women if they smoke and to offer referral if they do.
- Support should also be offered to partners or other household members who smoke.

A Cochrane review (Chamberlain et al, 2013) looking at psychosocial interventions to support pregnant women to stop smoking, found that overall they were effective in helping women to stop smoking. There did not appear to be any adverse effects from interventions and some of the studies showed an improvement in psychological wellbeing.

This review considered a number of different types of psychosocial intervention:

1. Counselling interventions-these provide motivation to quit and support to increase problem solving and coping skills. Examples include motivational interviewing, cognitive behaviour therapy, psychotherapy and other strategies. They can be provided by a range of methods e.g. face to face, by telephone or computer and by a range of professionals. They can vary from short interventions lasting a few minutes to longer interventions provided over a series of sessions. There were more studies on this type of intervention than the other interventions included within the review. Counselling interventions were significantly more effective than usual care in helping women stop smoking. However, when the control group received a less intensive intervention there was only borderline evidence for effectiveness. In addition, significant effects were only found when counselling was combined with other interventions and it was unclear whether any particular type of counselling strategy was more effective than others.

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2. Health education interventions-women are provided with information about the risks of smoking and advised to quit, but not provided with further support or advice about how to do this. These interventions were not significantly more effective than either usual care or a less intensive intervention.
3. Feedback interventions-mothers are provided with feedback on fetal health or measurements of the products of tobacco smoke within her body. Examples might include ultrasound or carbon monoxide monitoring. These were significantly more effective than usual care, particularly when provided alongside other interventions such as counselling.
4. Incentive based interventions. In these women are provided with a financial incentive e.g. gift vouchers provided they stop smoking. The results of these studies were mixed and studies varied considerably making it difficult to combine the findings; however a number of studies demonstrated incentives to have a significant effect. Incentives were found to have the largest effect size of all the interventions looked at, but only when provided intensively.
5. Social support from peers or partners. Social support interventions provided by peers were found to be effective, but this was not the case in the single trial of support provided by partners. Peer support was only effective when provided as a targeted intervention aimed at smoking cessation, rather than as a broader intervention to improve maternal health.

It is important to note that higher intensity interventions did not necessarily demonstrate a stronger effect. The authors concluded that it is therefore important to put the focus on the quality of the intervention and ensuring provision of support is convenient for women and does not overburden them.

Women who received psychosocial interventions had a significant reduction (18%) in preterm births, and in the proportion of babies who were born weighing less than 2500g (18%) and there was a significant increase of 41g in mean birthweight. Approximately 71 interventions are required to prevent one preterm birth and 61 interventions to prevent one baby being born with low birthweight.

A Cochrane review on the effectiveness of pharmacological interventions for promoting smoking cessation in pregnancy (Coleman et al, 2015) identified nine trials (eight of nicotine replacement therapy (NRT) and one small trial of bupropion which included only 11 women) with a total of 2,210 pregnant smokers. They found no trials of varenicline or e-cigarettes. They found that NRT increased smoking cessation rates in late pregnancy by approximately 40%. However, once trials that did not include a placebo were excluded, NRT was no more effective than placebo. There was no evidence that NRT had either positive or negative impacts on birth outcomes. However, in the one trial that followed infants up to two years of age, those born to women who had received NRT had better developmental outcomes. Reported adherence to NRT was generally low.

A systematic review by Baxter et al (2010) identified ten aspects of service delivery that may have an influence on the uptake of smoking cessation services by pregnant women who smoke. These were:

1. Whether or not the subject of smoking is broached by a health professional.
2. The content of advice and information provided.
3. The manner of communication- women are sensitive to the approach and tone used, with a supportive approach rather than 'nagging' being required.
4. Use of service protocols- having policies and procedures in place which describe the care that should be provided for pregnant women smokers.
5. Follow-up discussions at subsequent appointments of both smoking and any attempts to reduce/quit.
6. Staff confidence in their skills.
7. The impact of time and resource constraints.
8. Staff perceptions of ineffectiveness of interventions and potential for their input to lead to change.
9. Differences between professionals, e.g. midwives were more likely to refer on to other services than doctors, midwives were more likely to advise pregnant women to cut down whereas doctors were more likely to advise them to quit completely.
10. Obstacles to accessing interventions. These included women's fear of failure, length and timing of the sessions, lack of transport and childcare to allow them to attend.

Self-help interventions may appeal to some smokers who prefer not to engage with smoking cessation services. These could include written, video or computer based approaches. A systematic review of self-help interventions for pregnant smokers (Naughton et al, 2008) found that on average they nearly doubled the odds of quitting compared to standard care. Interventions of greater intensity did not significantly increase the odds of quitting compared to less intensive interventions.

A systematic review of qualitative research looking at health professionals' perceptions of the barriers and facilitators to supporting smoking cessation during pregnancy and following delivery (Flemming et al, 2016) found that health professionals, including midwives, saw supporting smoking cessation as a key part of their role. However, this required up to date knowledge and experience as well as supportive organisational structures. Skills gaps identified including both opening up the issue of smoking cessation as well as following up on their initial discussions. They felt they lacked the knowledge and skills to provide women with information in a way that would be well received and worried about it getting it wrong. There was also a sense of organisational constraints around the time taken to give smoking cessation advice, and a feeling that interventions were ineffective. They also expressed reservations about the use of nicotine replacement therapy. Professionals felt that their relationship with the pregnant woman was crucial in helping meet their responsibilities to her and the baby. They felt that there was a tension between maintaining a positive relationship and addressing the issue of smoking and some were concerned that even

asking about smoking status or raising it again at subsequent appointments could have a negative effect on their relationship with the pregnant woman. A common approach was to not offer information unless the woman had asked for it or could see the need of it. Some did recognise that in prioritising the relationship with the mother and avoiding confronting a behaviour that was a significant health risk they were failing to meet their professional responsibility to both mother and baby. Not all professionals responded in this way, some reported that although conversations about smoking could be difficult they did not avoid them. It was also recognised by some that supporting a woman to stop smoking could have a positive effect on the relationship between the professional and the woman, with women being appreciative of the help they were being given. Professionals recognised that women often faced many barriers to stopping smoking. As a result this meant they often advised women to cut down rather than quit. A UK based study (Condliffe et al, 2005) is consistent with the findings of this review. This study found that although a substantial majority (73%) of maternity staff at a London Hospital believed that helping pregnant women to stop smoking was one of the most important things a midwife could do, this did not translate into action, with a similar number (71%) not advising any pregnant woman to stop smoking in the previous seven days.

The importance of an organisation having smoking cessation policies, practices and procedures focussed specifically on pregnant and postpartum smokers was highlighted in the Flemming review (2016). Absence of these was perceived as a barrier to delivering smoking cessation support. Another important factor was the development of systematic relationships between organisations, practitioners and experts to facilitate shared learning, referral pathways and intervention development. Adequate resourcing was seen as essential in building a system of co-ordinated services with trained professionals, as well as to adapt programmes to meet the needs of particular groups. In one study included within the review midwives and health visitors questioned whether smoking should be more reasonably regarded as a social issue than a medical one and questioned whether smoking cessation advice should be delivered by health professionals. It was suggested that former smokers might be appropriate role models and smoking cessation advisors.

A pregnant woman's success in stopping smoking is likely to be influenced by the smoking status of her partner as well as those around her. It is thought that those with a supportive partner who is also trying to stop smoking may be more likely to successfully quit. However, Hemsing at al (2012) carried out a systematic review on this topic and found that there was only limited evidence in favour of encouraging partners to support smoking cessation. However, they found moderate evidence that smoking cessation interventions during pregnancy could improve smoking cessation in partners. There was inconsistent evidence that effectiveness of the intervention was influenced by the intensity at which it was provided. The multicomponent nature of many of the interventions made it difficult to draw firm conclusions on what the effective components of interventions might be. Some studies indicated that effectiveness of the intervention varied with the socio-economic status of the

partner, with interventions being less likely to be effective in those with lower education and income levels.

The BabyClear programme involves carbon monoxide testing of all pregnant women at booking, as well as referral of all pregnant smokers to the stop smoking service, taking an opt out, rather than an opt in approach. There have been problems within Kent with the quality of data recording, meaning that data prior to 2016/17 is not reliable. The table below shows selected data from the Kent BabyClear programme for the first half of 2016/17 (April to September). In a small number of cases (3.7%), women were no longer pregnant when contacted by the stop smoking service, so where stated in the table data is specific to those who were still pregnant.

Table 8: Kent BabyClear data, April-September 2016.

	All Kent	**East Kent**	**Swale**	**DVH**	**MTW**
Number of Booking Appointments E3	10,383	3,724	725	2,884	3,050
Known Smokers at Booking E3	1,330	658	159	306	207
CO Readings at Booking E3	4,300	2,078	578	1,644	0
Total Referrals on Quit Manager	505	156	45	51	250
Number (%) of referrals received with CO reading recorded	164 (32%)	94 (60%)	32 (71%)	15 (29%)	23 (9%)
Declined Service on contact	77	25	5	*	46
Unable to contact/Referral Closed	326	94	28	43	161
Accepted Service on contact (Pregnant)	99	37	12	7	41

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| Quit dates set | 38 | N/A | N/A | N/A | N/A |
| Quit (Pregnant) | 20 | N/A | N/A | N/A | N/A |

*Numbers <5 suppressed
Source: BabyClear data

This illustrates a number of problems within the Kent stop smoking pathway which contribute to the high numbers of women still smoking at time of delivery. There is considerable variation by Trust in terms of the numbers of pregnant women receiving carbon monoxide screening at booking and only 38.0% of those identified as smokers were referred into the stop smoking service. Only 15.2% of women actively declined the service, however the stop smoking service was unable to contact nearly two thirds (64.6%) of those referred. Less than one fifth (19.6%) of those referred actually accepted the service and only about one fifth of these (20.2%) went on to quit.

NICE has produced a template which allows local estimation of the costs of cases of maternal and infant complications which can be avoided if women give up smoking in pregnancy. (NICE tools and resources, 2010). The table below is taken from this template and shows how many more women could be supported to stop smoking if the current uptake of pregnant women receiving stop smoking support (defined as the proportion of pregnant smokers setting a quit date) was increased from 2.86% to 10% (an additional 160 women).

Table 9: NICE modelling, increased uptake of smoking cessation services.

	Percentage	Number of people
Number of pregnant women[1]	100%	17,234
Smoking prevalence in pregnancy[2]	12.98%	2,237
Current uptake of pregnant women receiving NHS stop smoking support[3]	2.86%	64
Future uptake of women receiving NHS Stop Smoking support	10%	224
% increase of pregnant women receiving NHS stop smoking support as a result of the guidance	7%	160

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Number of (additional) women successfully quitting smoking as a result of contact with NHS services[4]	52.6%	84
Pregnant women who stopped as a % of all women who smoke (additional quitters)	3.8%	84/ 2,237
Estimated number of births to women who smoke		2,237

[1] Births to Kent women in 2015.

[2] Smoking at time of delivery in 2015/16 used, but true numbers smoking in pregnancy are likely to be higher.

[3] Proportion of pregnant smokers setting a quit date. Based on local Babyclear figures.

[4] Percentage of pregnant women who set a quit date who successfully quit is based on local Babyclear figures.

Source: NICE

The table below shows the result of this increased uptake of smoking cessation services in terms of number of cases due to smoking that could be avoided and the total cost of these cases. This demonstrates that even a comparatively small increase in the number of women receiving stop smoking support of 160 women (translating to an additional 84 quitters) could result in a total of 28 maternal and infant complications avoided and savings of £53,084.

Table 30: NICE modelling, savings from maternal and infant complications avoided.

	Local assumptions		
Details	Cases due to smoking[1]	Unit cost £[2]	Total cost £
Maternal complications			
Ectopic pregnancy	1.15	1,081	1,243
Premature rupture of membrane	9.46	2,679	25,343
Placenta praevia	0.89	2,679	2,384
Abruption placenta	0.48	2,679	1,286

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Pre-term delivery	5.55	2,679	14,868
Pre-eclampsia	- 0.65	2,679	- 1,741
Total maternal complications	**16.88**		**43,384**
<u>**Infant complications**</u>			
Low birth weight	6.62	870	5,759
Respiratory distress	2.81	870	2,445
Sudden infant death syndrome (SIDS)	1.72	870	1,496
Total infant complications	**11.15**		**9,701**
Total savings	**28.03**		**53,084**

[1] Number of cases that would be expected to be avoided if uptake of smoking cessation services increased as in the previous table.

[2] Based on 2010/11 national tariff costs

Source: NICE

The table below shows the results of a sensitivity analysis, if different variables are used within the calculations.

- Smoking prevalence of either 12.98% (smoking at time of delivery rates) or 38% (the numbers known to have been a smoker at some point prior to pregnancy), or 25% (roughly midway between the two figures).

- A 5%, 10%, 15% or 20% future uptake rate (proportion of pregnant smokers setting a quit date)

This demonstrates that the estimates in the table above are likely to be fairly conservative. In view of the fact that only a very low proportion of pregnant smokers in Kent (currently 2.86%) actually set a quit date via the stop smoking service, there is considerable scope to increase this further with consequent reductions in complications and savings to the NHS.

Table 41: NICE modelling, sensitivity analysis.

Smoking prevalence in pregnancy	Future uptake of women receiving NHS Stop Smoking support	Additional women quitting	Total maternal and infant complications avoided	Total savings
12.98%	5%	25	8.65	£16,373

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12.98%	10%	84	28.0	£53,084
12.98%	15%	143	46.0	£87,158
12.98%	20%	202	62.8	£119,023
25.0%	5%	49	17.0	£32,133
25.0%	10%	162	54.0	£102,305
25.0%	15%	275	88.5	£167,616
25.0%	20%	388	120.7	£228,640
38.0%	5%	74	25.6	£48,468
38.0%	10%	246	82.0	£155,316
38.0%	15%	418	134.5	£254,809
38.0%	20%	590	183.5	£347,654

Source: NICE

4.1.5   Recommendations

- Maternity commissioners and providers should work together to address the high numbers of Kent women smoking at time of delivery. In view of the importance of smoking as a cause of both maternal and infant complications and the significance given to this by NHS England in the reducing stillbirths care bundle (NHS England, 2016) as well as the availability of effective and cost effective interventions, this should be a priority area for action.
- Maternity providers should work with staff to increase the completeness of carbon monoxide monitoring by midwives at the booking appointment.
- Maternity providers should work with staff to ensure all those women identified as smokers or with a raised carbon monoxide reading at booking are referred to smoking cessation services.
- Maternity commissioners and providers to work together to identify the most suitable approaches to tackle the high number of women who the smoking cessation service is unable to make contact with.

In addition there are a number of relevant recommendations included within the review by Buttivant (2014), including:

- Wherever practicable the paper-based information that is provided to parents across Kent on issues such as lifestyle, breastfeeding and preparation for parenthood

should be standardised. All 3 maternity service providers should work together to review the contents of the leaflets currently provided antenatally and postnatally to identify the most appropriate sources of information

- The Kent Public Health Team should collaborate with CCGs to review the commissioning, provision and uptake of "Making Every Contact Count" training for midwives and other health professionals on the maternity care pathway and create an action plan to ensure MECC training is available to all staff to increase their confidence in providing opportunistic brief interventions on lifestyle change.

- Midwives should liaise with the Smoking Cessation Service to identify opportunities to receive automatic feedback on women who do not accept the initial referral for support.

4.2 Obesity

Approximately half of all women of childbearing age in England are either overweight or obese. Although data on maternal BMI is not routinely collected, results from a large national study conducted in 2007 found that 15.6% of pregnant women had a BMI of more than 30. In total 10% had a BMI of 30-34.9, 3.8% had a BMI of 35-39.9, 1.6% had a BMI of 40-49.9 and 0.2% had a BMI of 50 or more. Studies have also shown an increase in the prevalence of obesity over time. (Public Health England, 2015)

Women who are obese (BMI of 30 or more) when they become pregnant have an increased risk of complications in pregnancy and childbirth (NICE, 2010). Risks include impaired glucose tolerance and gestational diabetes, miscarriage, pre-eclampsia and maternal death. Even a relatively small increase in BMI between pregnancies of 1-2 BMI units increases the risk of gestational diabetes and gestational hypertension, even in women who are not overweight or obese. They are also at increased risk of giving birth to a large baby.

Obese women are also more likely to have complications of labour or delivery such as induced or longer labour, instrumental delivery, caesarean section or postpartum haemorrhage. Reduced mobility in labour can lead to an increased need for pain relief, which can be difficult to administer in obese women, meaning an increased need for general anaesthesia with its associated risks. Obese women are more likely to spend longer in hospital because of problems during pregnancy or delivery related to their weight.

After delivery obese women are more likely to slower wound healing and an increased risk of infection. They are also likely to require more support with establishing breastfeeding. In the longer term they are at increased risk of type 2 diabetes, some cancers and coronary heart disease.

Babies born to obese women also face a number of health risks. These include an increased risk of fetal death, stillbirth, congenital abnormalities, shoulder dystocia and macrosomia. They are also at increased risk of obesity in the future.

It has been estimated that 29% of diabetes in pregnancy, 12% of caesarean section, 5% of post-partum haemorrhage, 4% of preterm delivery, 7% of macrosomia, and 5% of admissions to a neonatal intensive care unit or special care baby unit could potentially be avoided if all pregnant women were of normal BMI at the start of pregnancy. (Public Health England, 2015)

High maternal BMI is associated with increased health service usage and costs (Public Health England, 2015). Recent economic studies from the UK have found that maternity costs are significantly higher for overweight or obese women compared to women of a healthy BMI. A Welsh study found that there was an increase in total health service costs during pregnancy for overweight women of 23% and for obese women of 39% compared with women of a healthy weight. This equated to an additional £698 for each overweight woman and £1,171 for each obese woman, in addition to the £3,546 costs for women with a healthy BMI. Overweight and obese women had approximately 15-20% greater usage of all hospital services, a 30% higher mean number of days spent in hospital and a 10% higher mean usage of GP visits. A large Scottish study calculated that additional maternity admission costs were £150 for overweight women, £399 for obese women and £755 for severely obese women. Fifty percent of these increased costs were explained by an increase in clinical complications. Compared with women of a healthy weight, women who were overweight, obese or severely obese were associated with a 16%, 46% and 88% increase in the number of admissions.

There is evidence that diet and/or exercise interventions during pregnancy can help to reduce excessive weight gain in pregnancy. In 2012 a Health Technology Assessment (Thangaratinam et al, 2012) concluded that dietary and physical activity interventions in pregnancy are effective at reducing maternal weight gain. Interventions that are mainly based on diet were effective in reducing obstetric complications such as pre-eclampsia, gestational hypertension and shoulder dystocia. There was no evidence of harm to the mother or foetus from the diet or physical activity components of the interventions. Interventions varied in both nature and intensity, but those based on diet were felt to be most effective. Another systematic review (Oteng-Ntim et al, 2012) also concluded that lifestyle interventions were effective at reducing maternal weight gain. They also felt that there was a trend towards reduction of gestational diabetes (though this finding was not statistically significant). However, interventions had no significant effect on other outcomes such as Caesarean delivery, large for gestational age, birth weight or macrosomia. Studies were of low to medium quality and interventions varied in nature and intensity, making it difficult to draw firm conclusions on exactly what needs to be provided.

A recent Cochrane review (Muktabhant et al, 2015) found that weight management interventions led to a reduction in the number of women gaining excess weight by a fifth (range 13-27%) over the pregnancy. They found no clear differences between groups in the rate of caesarean sections overall, but for combined diet and exercise interventions there was a 13% reduction of caesarean deliveries which was of borderline statistical significance.

Although maternal hypertension was reduced in the intervention group, there was no difference in rates of pre-eclampsia. There were no clear differences in the rates in infant macrosomia, though in the supervised exercise only group this did approach statistical significance. In high risk women (overweight or obese, or who had or were at risk of gestational diabetes) who received combined diet and exercise interventions, there was a 15% reduced risk of macrosomia. They found no differences in the risk of poor neonatal outcomes including shoulder dystocia, neonatal hypoglycaemia, hyperbilirubinaemia, or birth trauma between intervention and control groups; however, infants of high-risk women in the intervention group had a reduced risk of respiratory distress syndrome.

A large randomised controlled trial of 2212 women with a BMI of 25 or more was carried out in Australia (Dodd et al, 2014), which looked at the effects of a comprehensive dietary and lifestyle intervention. This was delivered by a dietitian and trained research assistants and involved three face to face sessions and three telephone contacts. The primary outcome under consideration was incidence of infants born large for gestational age. The authors also considered a wide range of pre-specified secondary maternal and infant outcomes. There was no significant difference in the incidence of infants born large for gestational age, although infants of mothers who received lifestyle advice were less likely to weigh above 4000g. Apart from this there were no differences in pregnancy and birth outcomes between groups and no difference in gestational weight gain between groups.

Another large randomised controlled trial of 1,555 obese pregnant women has been conducted within the UK (Poston et al, 2015) looking at the effects of eight once weekly, health trainer led sessions (these were a combination of face to face, telephone and email sessions). Similar to the trial above, the authors found the intervention had no effect on the primary outcomes of gestational diabetes or large for gestational age babies. They did, however, find some impact on secondary maternal outcomes such as reduced dietary glycaemic load and gestational weight gain as well as an increase in physical activity. Follow up of mothers and their children is ongoing in order to assess whether the benefits seen, though not leading to an improvement in pregnancy outcomes, may lead to benefits in maternal and child health in the longer term.

A study modelling the effect of a weight management programme in postnatal women from an NHS and personal social services perspective (Rawdin et al, 2014) concluded that it would be cost effective. However, there were a number of limitations with the approach used, based primarily around the nature of the evidence base available.

NICE guidance (2010) recommends that women with a BMI of 30 or more who may become pregnant should be supported to lose weight before becoming pregnant. Weight loss programmes are not recommended in pregnancy. There are no evidence based UK guidelines on recommended weight gain during pregnancy. At the first visit to a health professional during pregnancy, physical activity and a healthy diet should be discussed with the pregnant woman. Women with a BMI of 30 or more at booking should be offered a referral to a dietitian or other appropriately trained health professional for assessment and

personalised advice on healthy eating and physical activity during pregnancy. They should be encouraged to lose weight after pregnancy. The 6-8 week postnatal check should be used to discuss weight and offer further advice and support.

The review of the relationship between public health and maternity services in Kent with respect to delivery of the antenatal and postnatal aspects of the Healthy Child programme (Buttivant, 2014) identified a lack of capacity within dietetic services to support all pregnant women with a BMI of 30 or more. Thresholds for referral were often set higher than this, for example 35 in DVH and 40 in MTW.

Pregnant women who are obese need to receive appropriate monitoring and investigations during pregnancy, to identify and manage any complications, for example considering the risk of thromboembolism. They should also be offered testing for gestational diabetes (NICE, 2012). Pregnant women with a BMI of 40 or more should be offered a consultation with an obstetric anaesthetist as well as an assessment in the third trimester of pregnancy to identify any manual handling requirements for childbirth. Women with a booking BMI of 30 or more should be referred to a consultant obstetrician to enable a discussion about possible intrapartum complications and management strategies for these (RCOG, 2010).

No nationally published data is available on obesity prior to pregnancy. Data extracted from Euroking provides a measure of obesity levels and excess weight at booking for each of the three acute trusts in Kent. This is consistent with the national picture of approximately half of women of childbearing age being either overweight or obese.

BMI at booking: by Trust
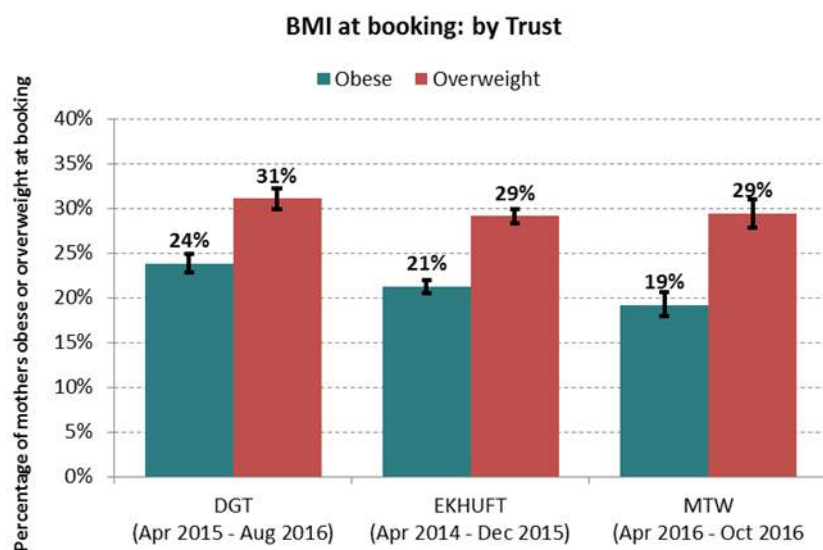
Source: Euroking, prepared by KPHO (RK), December 2016

An estimate of levels of obesity and excess weight has also been derived from the GP records included in the KID. Pregnant women with a BMI recorded by their GP within the 12 months prior to conception or the first 3 months of pregnancy have been analysed. This provides data on BMI for 16% of the pregnant women identified in the KID (1421 women) and registered with a participating practice (which equates to around 8% of live births over this period).

As the chart below illustrates, this approach produces broadly similar figures to those extracted from Euroking. Given this broad consistency, the decision was taken to utilise this measure of obesity and overweight as variables for cross-analysis later in this report.

BMI: by CCG
BMI measurements taken by GPs in the 12 months prior to pregnancy , 2015/16

Source: Kent Integrated Dataset, prepared by KPHO (RK), December 2016

Maternity needs assessment, March 2017
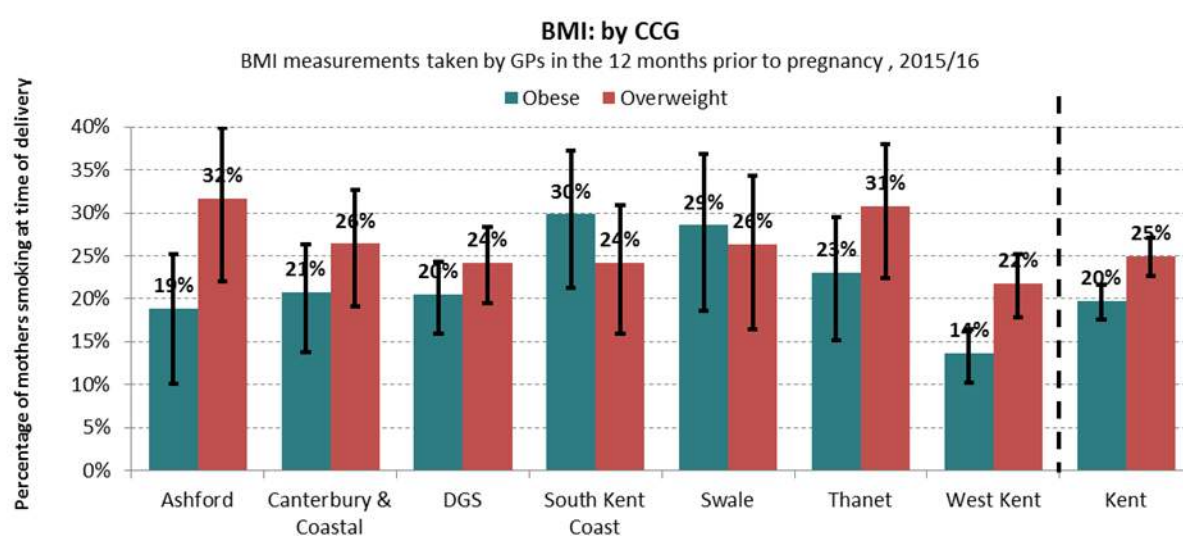
Recommendations:

- Commissioners and providers should work together to ensure that there is sufficient capacity to refer all women with a BMI >30 for dietetic support as per the NICE Guideline PH27

4.3 Drugs and Alcohol

A survey of maternity units in the UK found that, in those who responded, an estimated 1% of pregnant women were problem drug users and a further 1% were problem drinkers (Advisory Council on the Misuse of Drugs, 2011). Many female drug users have their first child in their teens, so the problems of drug use may be compounded by those associated with teenage pregnancy. They may also have co-existing mental health problems. Maternal drug use in pregnancy can affect fetal growth and development. For example delays in cognitive development at the age of two have been seen in children of mothers who used cocaine in pregnancy, which may persist in later childhood. Assessing the impact is difficult due to the effect of multiple drugs often being taken in varying doses in the context of often unfavourable social circumstances and poor maternal nutrition. Many drug users are also smokers, and may also be using alcohol as well as drugs. Where the mother is a frequent, heavy drinker fetal exposure to alcohol in pregnancy can lead to problems with delayed neurological development, physical abnormalities and growth impairment (fetal alcohol spectrum disorder), and even lighter or less frequent exposure to alcohol does not appear to be risk free. A number of drugs can also cause neonatal withdrawal symptoms. This can last for weeks or even months after birth and may require extended hospitalisation. Injecting drug use also carries the risk of transmission of viral infections such as Hepatitis B, C and HIV. Although the risk of an infected mother passing Hepatitis B to the baby is relatively high, the annual incidence of Hepatitis B infection in injecting drug users is estimated to be 1% per year and few become chronic carriers, so the numbers who may infect their baby are lower than for HIV or Hepatitis C. In addition infection can usually be prevented if the baby receives immunisation (plus or minus immunoglobulin) soon after birth. Prevalence of HIV infection in injecting drug users has been estimated to be 3% in London but less than 1% elsewhere. If the woman has not received anti-retroviral treatment during pregnancy the risk of transmission is 25%, however this reduces to about 2% with treatment. Rates of infection after birth are similar if the baby is breastfed. Therefore antenatal diagnosis and treatment is crucial to reduce the risk of transmission of HIV and Hepatitis B. The prevalence of Hepatitis C infection in injecting drug users in England and Wales is thought to average 30%, but is as high as 60% in some parts of Scotland, with a risk of transmission to the baby of 5-12% during pregnancy or birth. This means an estimated 15-70 babies per 1,000 pregnancies in injecting drug users are likely to be infected with hepatitis C, however there are no studies providing reliable information on this. The risk of infection may be reduced by elective caesarean section.

Better pregnancy outcomes are likely to result with good antenatal care, however drug using mothers are more likely to present late in pregnancy leading to missed opportunities to improve outcomes.

As a result of exposure to parental drug misuse the child will also be at risk of ongoing problems after birth, for example unsafe parenting practices, neglect and a dangerous home environment.

In order to achieve the best outcomes for pregnant drug and alcohol users, maternity services need to be accessible and non-judgemental, and known as such locally. This makes late presentation less likely. Maternity services also need to be able to offer a comprehensive and integrated approach to both the health and social care issues and involve women in decision making as much as possible. Staff need sufficient training and experience, and there should be protocols in place setting out the procedures that need to be followed. Maternity services also need to work closely with other services such as neonatal services, social care, primary care, addiction, health visiting and community paediatric services. Multi-agency assessments and planning will be needed to determine what will be in the best interests of the baby. Pregnant drug users should be routinely tested, with informed consent, for Hepatitis B, C and HIV and appropriate clinical management provided.

No nationally published data is available on alcohol consumption prior to and during pregnancy. Data extracted from Euroking provides a measure of alcohol consumption at booking, although this was only provided by one the three acute trusts in Kent (EKHUFT). This data suggests that 3% of pregnant women reported drinking up to 14 units a week at the time of booking, and that less than 0.1% reported drinking more than this.

It has not been possible to explore alcohol consumption via the KID.

| 5. Long term conditions

The state of a woman's health before pregnancy can impact on her wellbeing throughout pregnancy as well as the health of her baby. Some health conditions will require careful monitoring to minimise any associated risk. This needs assessment looks at the prevalence of long term conditions in Kent women prior to pregnancy, as well as those arising during pregnancy and in the six months following birth.

Perinatal mental illnesses are those occurring in pregnancy and the first year after birth. They may pre-date the pregnancy or occur for the first time during this period and may affect up to 20% of women. A Perinatal Mental Health Needs Assessment for Kent was completed in 2016 and can be found at:
http://www.kpho.org.uk/__data/assets/pdf_file/0009/57960/Perinatal-Mental-Health-Needs-Assessment.pdf

One of the recommendations from the review of the relationship between public health and maternity services with respect to the antenatal and postnatal elements of the healthy child programme, (Buttivant, 2014) was for commissioners and providers to collaborate to produce a Kent-wide perinatal mental health pathway with equitable access to perinatal mental health support at all levels of need, including prevention services, for pregnant women across Kent. Kent and Medway have recently been awarded funding from the perinatal mental health community services development fund, to expand the perinatal mental health service, with improved integration with maternity and community services and broader training for other professionals. It is recommended that as part of this process the recommendations from both the report by Buttivant and those from the perinatal mental health needs assessment are addressed.

Data from the Kent Integrated Dataset (KID) have been used to investigate pre-existing health conditions, and health conditions arising during and immediately after pregnancy. A detailed account of the methodological approaches taken using each this data source and any data limitations are provided in Annex A.

Please note that all of analysis in this section is restricted to those women registered with GPs participating in the KID.

5.1 Long term conditions: Prior to pregnancy

5.1.1 Prevalence

The figure below provides a summary of the existence of long term conditions[2] in pregnant women <u>prior</u> to conception, as recorded by their GP. Only those conditions relating to 0.5% or more women are shown.

This analysis suggests that just under two in five pregnant women (38%) have at least one of these long term conditions. Around one in five (21%) have mental health conditions recorded and 15% respiratory conditions.

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[2] See Annex A for a list of the long term conditions included in this analysis.

Long term conditions: Prior to pregnancy

Long term conditions recorded on GP records**, Kent, 2015/16

61.9 % had no long
term conditions

20.9% had mental health
conditions

0.5% had diabetes

14.6% had
respiratory
conditions

0.6% had
hypertension

All
pregnancies*

9.3% had migraines

0.8% had epilepsy

1.8% had hypothyroidism
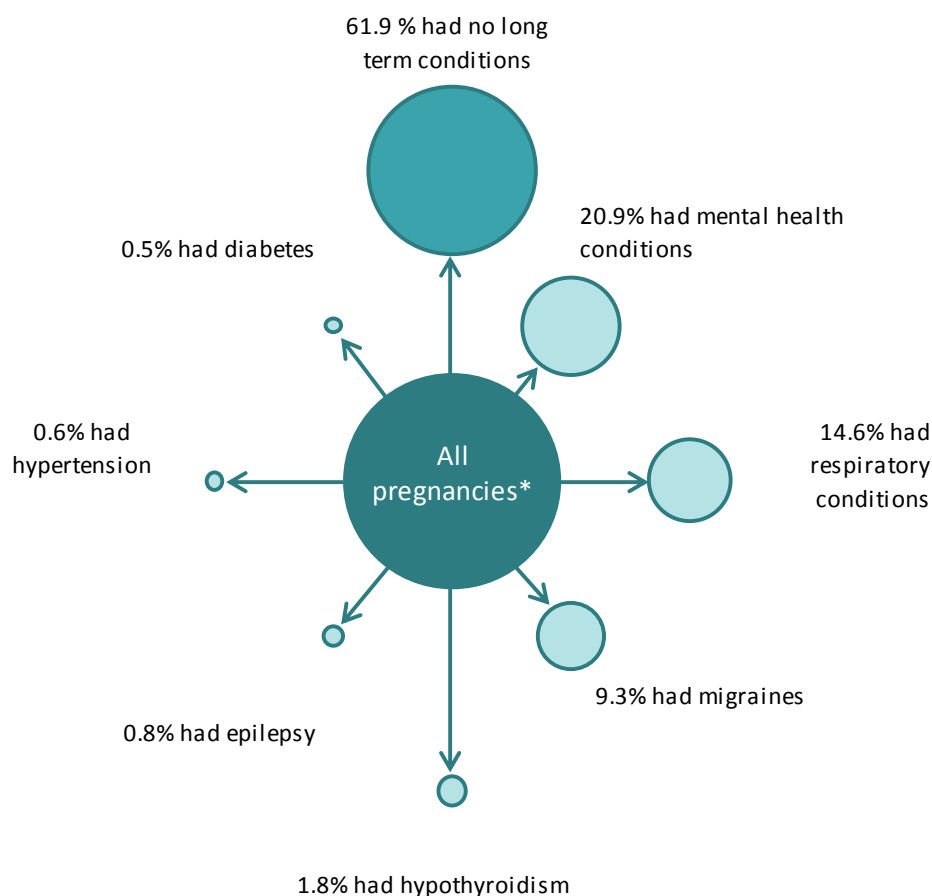
Source: Kent Integrated Dataset (KID), prepared by KPHO (RK), November 2016

* Figures relate to women resident in Kent giving birth to a live baby between April 2015 and March 2016 and registered at a GP participating in the KID (8937 women)

** Only conditions relating to 0.5%+ are shown

The table below provides a more detailed analysis of long term condition prevalence prior to pregnancy.

Table 12: Long term condition prevalence prior to pregnancy

Condition	Prevalence
Mental health conditions	**20.9%**
Depression	*14.1%*
Anxiety	*11.3%*
Anorexia/Bulimia	*0.6%*
'Mental health'	*0.4%*
Respiratory conditions	**14.6%**
Asthma	*11.5%*
Bronchitis	*4.3%*
Bronchiectasis	*
COPD	*
Migraine	9.3%
Hypothyroidism	1.8%
Epilepsy	0.8%
Hypertension	0.6%
Diabetes	0.5%
Thyrotoxicosis	0.4%
Cancer	0.3%
Hepatitis	0.2%
CKD	0.2%
MS	0.2%
CLD	0.1%
Cardiovascular conditions	**0.1%**
CVD	*
AF	*
CHD	*
HF	*
LD	*
Alcoholic liver disease	*
Rheumatic heart disease	*

*suppression due to low numbers

Source: Kent Integrated Dataset (KID), prepared by KPHO (RK), November 2016

Figures relate to women resident in Kent giving birth to a live baby between April 2015 and March 2016 and registered at a GP participating in the KID (8937 women).

5.1.2 Multimorbidity

The majority of pregnant women with long term conditions have only one. Around one in seven (14%) pregnant women have two or more long term conditions[3].

Long term condition prevalence: Prior to pregnancy
Number of long term conditions, Kent, 2015/16

Source: Kent Integrated Dataset (KID), prepared by KPHO (RK), November 2016
Figures relate to women resident in Kent giving birth to a live baby between April 2015 and March 2016 and registered at a GP participating in the KID (8937 women).

The figure overleaf illustrates the pattern of multimorbidity prior to pregnancy. The most common combination is respiratory and mental health conditions, which affects 5% of this group of pregnant women.

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[3] Please note that cardiovascular conditions, mental health conditions and respiratory conditions are each treated as single conditions in this analysis.

Maternity needs assessment, March 2017

Long term condition multimorbidity: Prior to pregnancy

Long term conditions recorded on GP records, Kent, 2015/16

Column headers (top): Alcoholic liver disease, Cancer, Cardiovascular conditions, CKD, CLD, Diabetes, Epilepsy, Hepatitis, Hypertension, Hypothyroidism, LD, Mental health conditions, Migraine, MS, Respiratory conditions, Rheumatic heart disease, Thyrotoxicosis

Row labels: Alcoholic liver disease, Cancer, Cardiovascular conditions, CKD, CLD, Diabetes, Epilepsy, Hepatitis, Hypertension, Hypothyroidism, LD, Mental health conditions, Migraine, MS, Respiratory conditions, Rheumatic heart disease, Thyrotoxicosis

Selected values shown: Mental health conditions × Migraine: 3.2%; Mental health conditions × Respiratory conditions: 5.0%; Migraine × Respiratory conditions: 2.1%

5.1.3 Profiling

The chart below provides a summary of the characteristics that tend to be associated with the existence of long term conditions and multiple long term conditions. In this analysis pregnant women identified as having different numbers of long term conditions have been analysed by demographic and lifestyle characteristics. Results for each demographic and lifestyle characteristic are presented indexed against the average across all pregnant women.

Long Term Conditions Prior to Pregnancy: By Demographics & Lifestyle
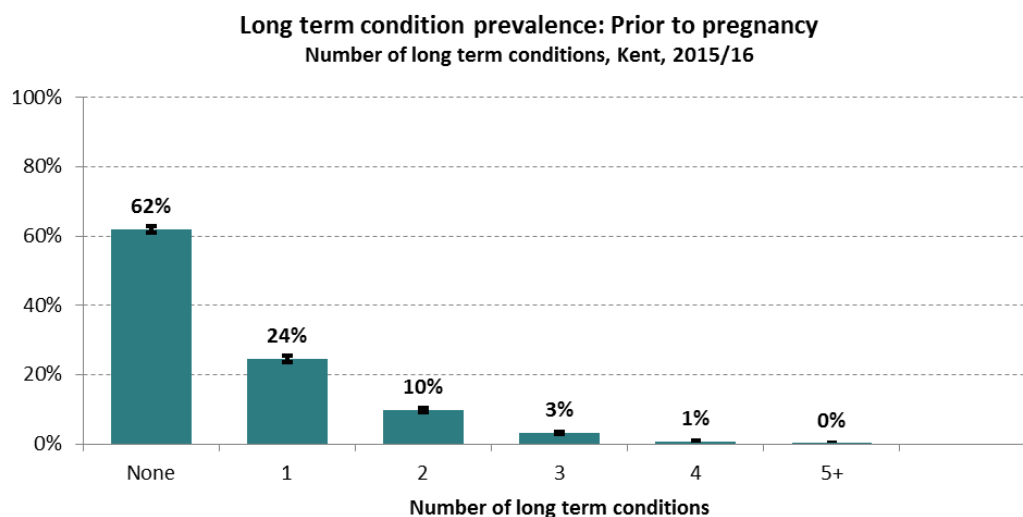**Pregnant women with long term conditions recorded on GP records, Kent, 2015/16**

Source: Kent Integrated Dataset (KID), prepared by KPHO (RK), November 2016
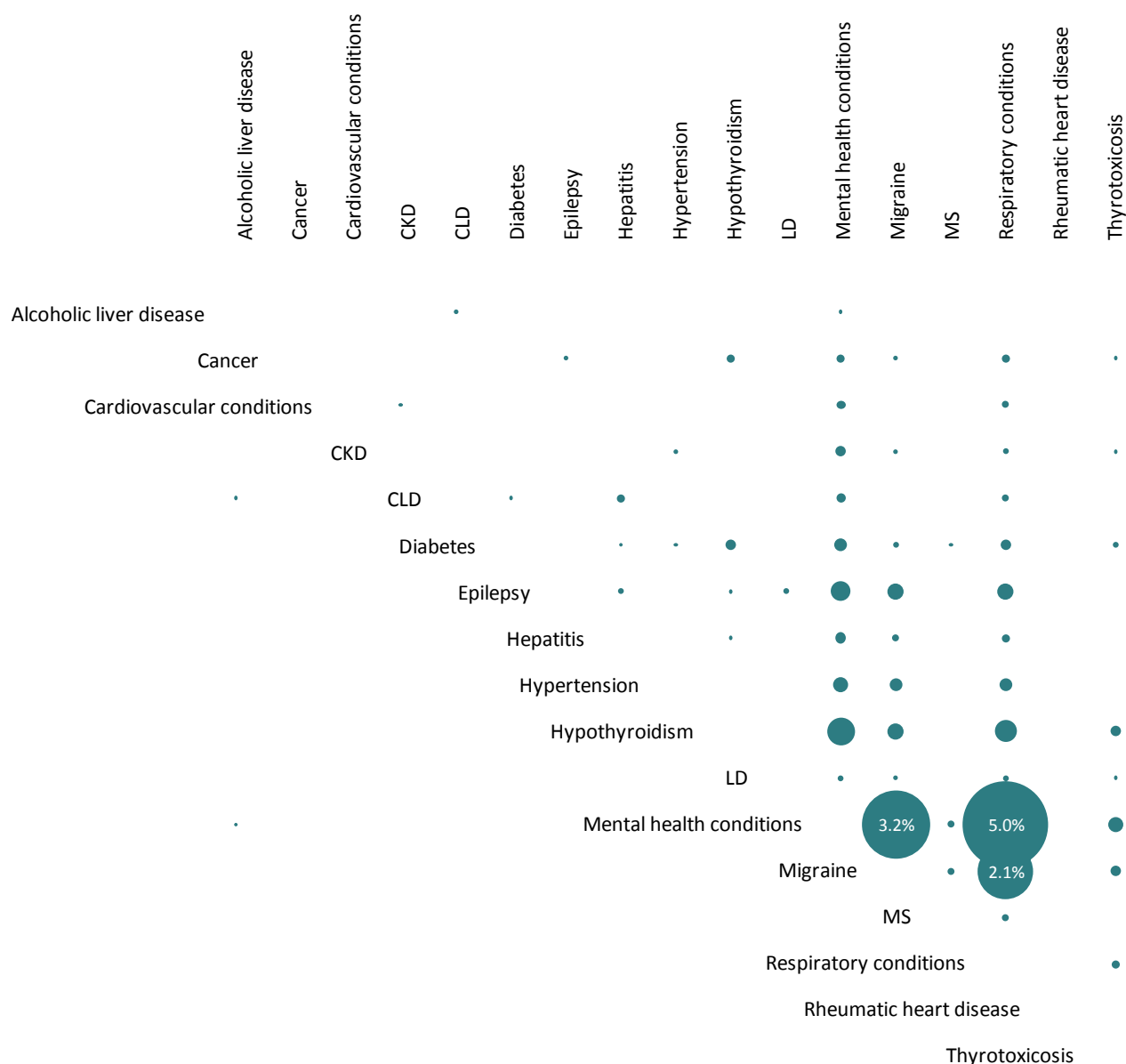Figures relate to women resident in Kent giving birth to a live baby between April 2015 and March 2016 and registered at a GP participating in the KID (8937 women).

This analysis shows that the following groups are more likely to have long term conditions prior to pregnancy, and particularly multiple long term conditions:

- Smokers
- Obese women

Mothers who are recorded by their GP as smokers[4] are 20% more likely to have one long term condition, 36% more likely to have 2 long term conditions and 64% more likely to have three or more long term conditions than the Kent average.

There is some evidence to suggest that pre-existing long term conditions are less prevalent with in teenagers than older mothers.

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[4] For the purposes of this analysis, women with a record of being a smoker prior to pregnancy are taken to be smokers.

Maternity needs assessment, March 2017

The chart below provides a similar analysis for women with a pre-existing mental health condition.

Mental Health Conditions Prior to Pregnancy: By Demographics & Lifestyle
Pregnant women with mental health conditions recorded on GP record, Kent, 2015/16

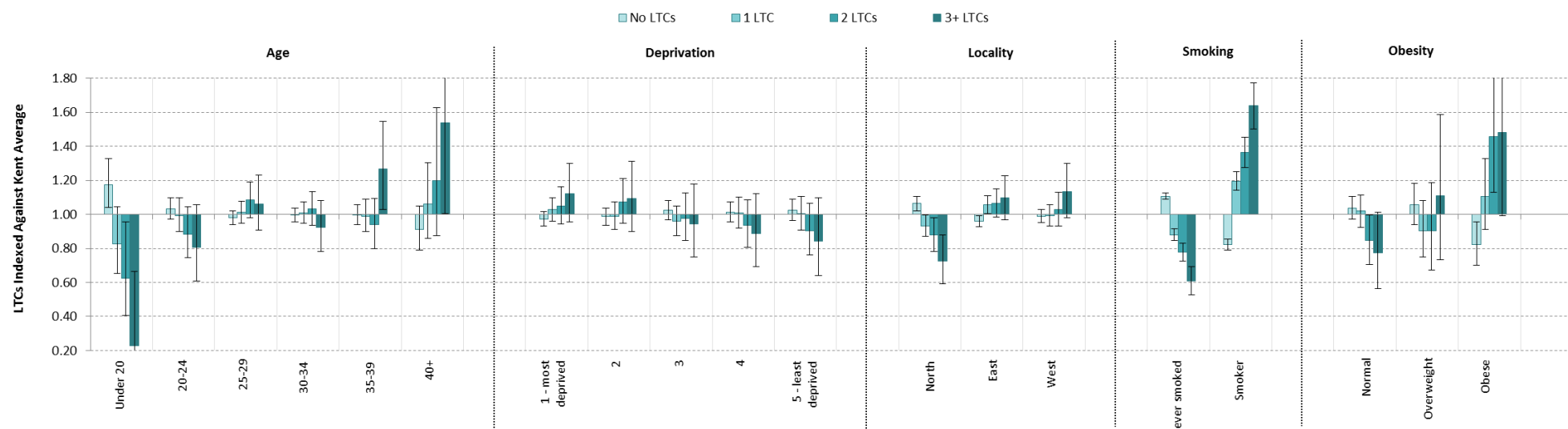□ Mental health conditions not recorded ■ Mental health conditions recorded
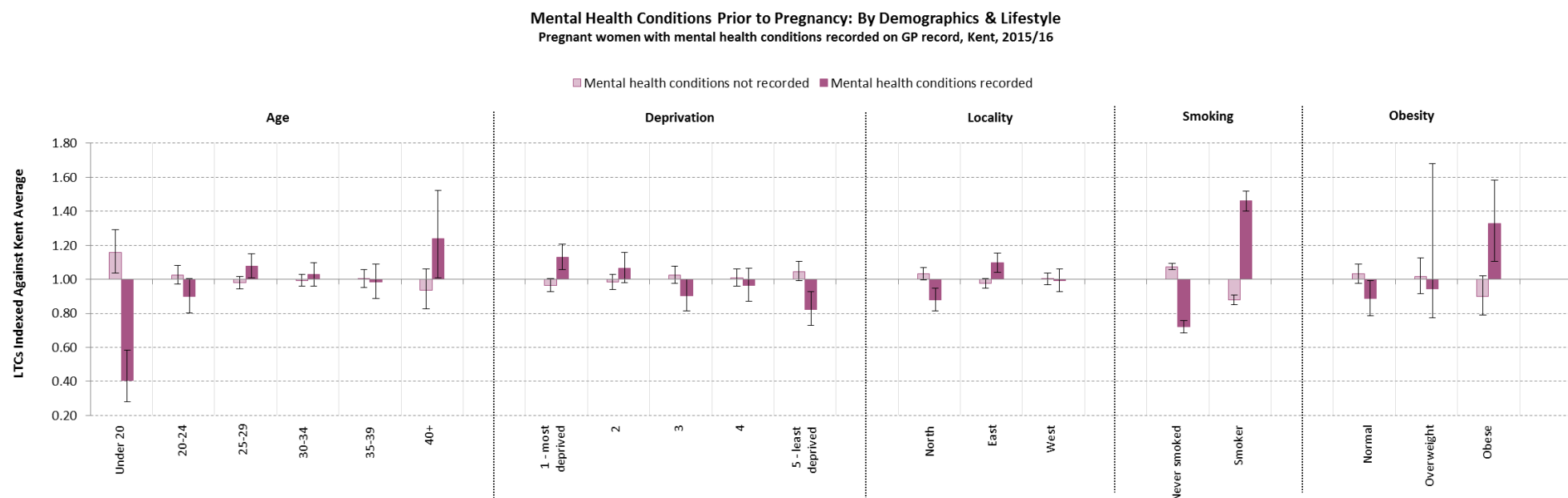
Source: Kent Integrated Dataset (KID), prepared by KPHO (RK), November 2016
Figures relate to women resident in Kent giving birth to a live baby between April 2015 and March 2016 and registered at a GP participating in the KID (8937 women). Mental health conditions include anorexia, anxiety, depression and mental health.

The following groups are highlighted as being more likely to have a mental health condition prior to pregnancy:

- Smokers (46% more likely than the Kent average)
- Obese women (33% more likely than the Kent average)
- Women living in more deprived areas (13% more likely for those in the most deprived quintile than the Kent average)

Younger women, and particularly teenage mothers, are less likely to have a mental health condition recorded by their GP prior to pregnancy.

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The chart below provides a similar analysis for women with a pre-existing respiratory condition.

Respiratory Conditions Prior to Pregnancy: By Demographics & Lifestyle
Pregnant women with respiratory conditions recorded on GP record, Kent, 2015/16

■ Respiratory conditions not recorded   ■ Respiratory conditions recorded

Source: Kent Integrated Dataset (KID), prepared by KPHO (RK), November 2016
Figures relate to women resident in Kent giving birth to a live baby between April 2015 and March 2016 and registered at a GP participating in the KID (8937 women). Respiratory conditions include asthma, bronchiectasis, bronchitis and COPD.

The following groups are highlighted as being more likely to have a respiratory condition prior to pregnancy:

- Smokers (35% more likely than the Kent average)
- Obese women (27% more likely than the Kent average)

The prevalence of pre-existing respiratory conditions does not appear to differ significantly according to deprivation or age.

Maternity needs assessment, March 2017

5.2   Long term conditions: During pregnancy

The figure below provides a summary of the prevalence of long term conditions[5] that appear during pregnancy, as recorded by their GP. Only those conditions relating to 0.1%+ or more women are shown. The analysis excludes long term conditions that existed prior to conception.

This analysis suggests that just 2% of women have any new long term conditions added to their record by their GP during pregnancy. Just over half of the conditions added are mental health conditions. Just two women had more than one condition added during pregnancy.
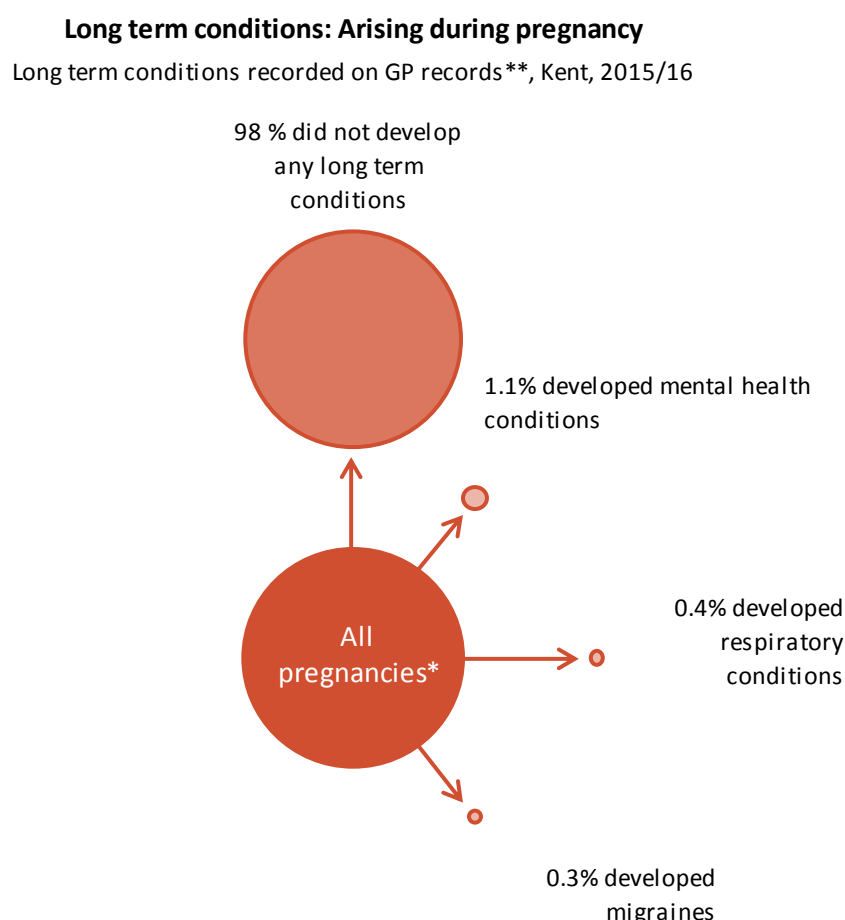
Long term conditions: Arising during pregnancy

Long term conditions recorded on GP records**, Kent, 2015/16

98 % did not develop any long term conditions

1.1% developed mental health conditions

All pregnancies*

0.4% developed respiratory conditions

0.3% developed migraines

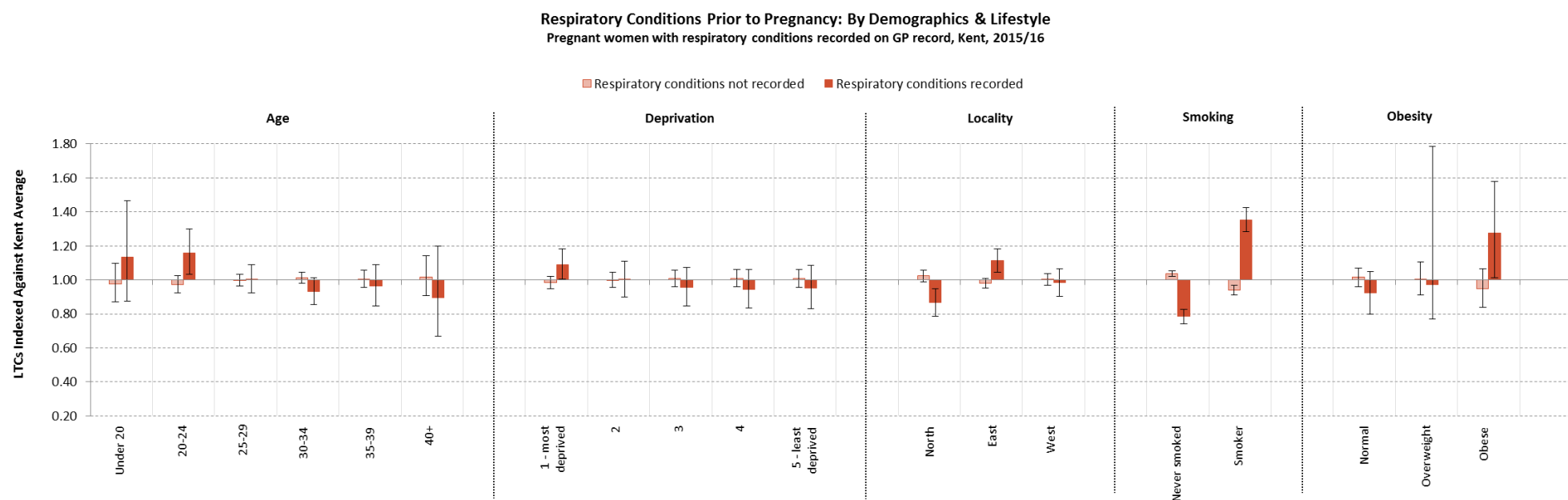Source: Kent Integrated Dataset (KID), prepared by KPHO (RK), November 2016

* Figures relate to women resident in Kent giving birth to a live baby between April 2015 and March 2016 and registered at a GP participating in the KID (8937 women)

** Only conditions relating to 0.1%+ are shown

5.2.1   Gestational Diabetes

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[5] See Annex A for a list of the long term conditions included in this analysis.

Maternity needs assessment, March 2017

An attempt has been made to identify women developing gestational diabetes using GP records. This analysis suggests that 4.5% of women develop gestational diabetes during pregnancy (and have this recorded by their GP).

The chart below provides a summary of the characteristics that tend to be associated with gestational diabetes. In this analysis pregnant women identified as having gestational diabetes via their GP records have been analysed by demographic and lifestyle characteristics. Results for each demographic and lifestyle characteristic have presented indexed against the average across all pregnant women.

Gestational Diabetes During Pregnancy: By Demographics & Lifestyle
Pregnant women with gestational diabetes recorded on GP record, Kent, 2015/16

Source: Kent Integrated Dataset (KID), prepared by KPHO (RK), November 2016
Figures relate to women resident in Kent giving birth to a live baby between April 2015 and March 2016 and registered at a GP participating in the KID (8937 women). Gestational diabetes identified via read codes L180, L1800-9, L180z

The following groups are highlighted as being much more likely to develop gestational diabetes during pregnancy:

- Older women (those aged 35+ are 88% more likely than the Kent average to develop gestational diabetes)
- Obese women (89% more likely than the Kent average to develop gestational diabetes)

The prevalence of gestational diabetes does not appear to differ significantly according to deprivation or smoking.

Maternity needs assessment, March 2017

5.3 Long term conditions: Post-pregnancy

The figure below provides a summary of the prevalence of long term conditions[6] that appear within the six months following birth, as recorded by GPs. Only those conditions relating to 0.1% or more women are shown. The analysis excludes long term conditions that existed prior to conception, or that arose during pregnancy.

This analysis suggests that just 1.5% of women have any new long term conditions added to their record by their GP during the six months following birth. The majority of the conditions added are mental health conditions. Just two women had more than one condition added post-pregnancy.
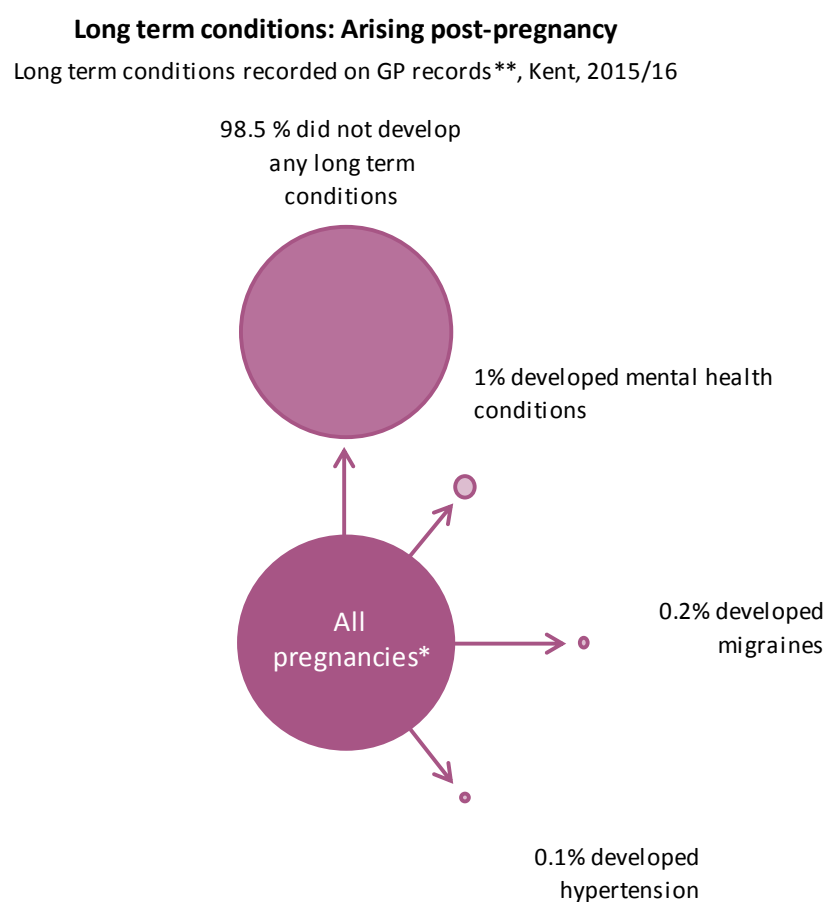
Long term conditions: Arising post-pregnancy

Long term conditions recorded on GP records**, Kent, 2015/16

98.5 % did not develop any long term conditions

1% developed mental health conditions

All pregnancies*

0.2% developed migraines

0.1% developed hypertension

Source: Kent Integrated Dataset (KID), prepared by KPHO (RK), November 2016

* Figures relate to women resident in Kent giving birth to a live baby between April 2015 and March 2016 and registered at a GP participating in the KID (8937 women)
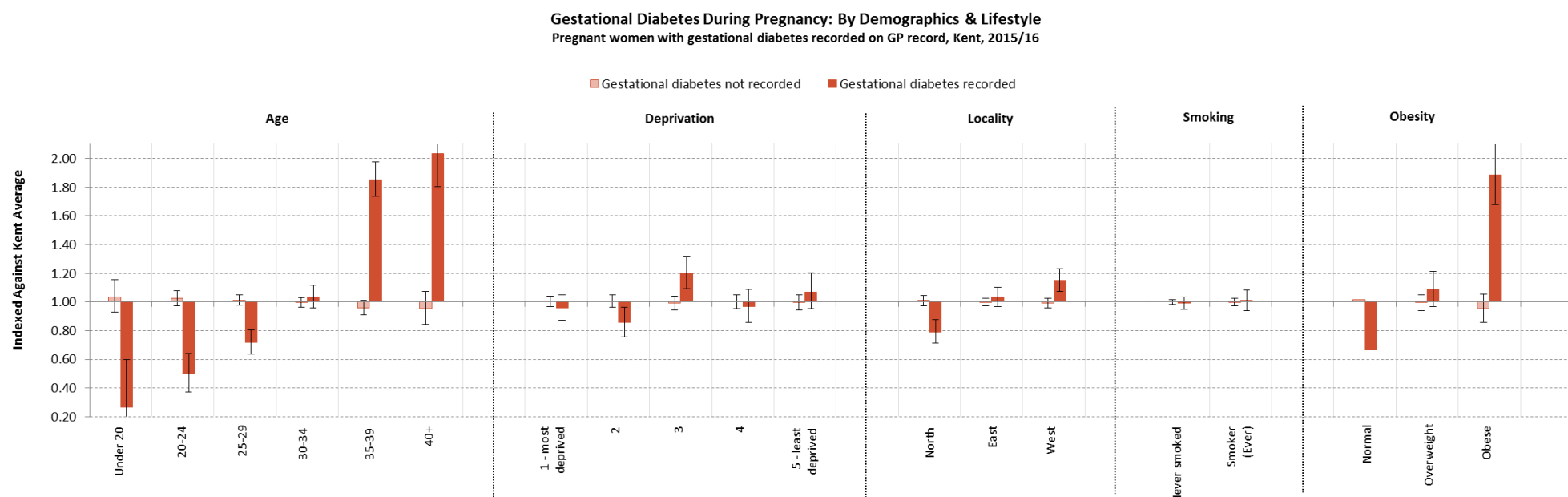
** Only conditions arising within 6 months and relating to 0.1%+ are shown

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[6] See Annex A for a list of the long term conditions included in this analysis.

Maternity needs assessment, March 2017

5.4   Recommendations

Evidence from this analysis confirms the importance of focusing on women with unhealthy lifestyles. In addition to the risks associated with smoking and obesity, these women are also more likely to have long term conditions, in particular multiple long term conditions, and mental health problems.

- As part of the process of expanding the perinatal mental health service, using the funding awarded from the perinatal mental health community services development fund, it is recommended that the recommendations from both the report by Buttivant and those from the perinatal mental health needs assessment are addressed.
- Providers should be alert to the increased risk of long term conditions and mental health problems in smokers and obese women and ensure these are appropriately managed during pregnancy and the postpartum period.

| 6. Wider health and social care service usage & costs

Data from the Kent Integrated Dataset (KID) have been used to investigate usage of wider health and social care services by pregnant women and the associated costs. Usage of community midwifery services are excluded. A detailed account of the methodological approaches taken using this data source and any data limitations are provided in Annex A.

6.1   Wider health and social care service usage & costs during pregnancy

This analysis covers usage of acute services (including A&E attendances, elective and non-elective hospital admissions and outpatient appointments), usage of some community services (mainly health visitors), GP contacts (surgery appointments, telephone contacts and home visits), mental health contacts, out of hours service contacts and contacts with adult social services.   The analysis excludes community midwife appointments.

Costing data is not available for obstetric outpatient appointments and so these have also been excluded from the cost analysis.

Please note that all of analysis in this section is again restricted to those women registered with GPs participating in the KID.

Wider health and social care service usage & costs during pregnancy
Average number of contacts/cost per pregnancy, excluding community midwife contacts/costs and outpatient appointment costs, 2015/16
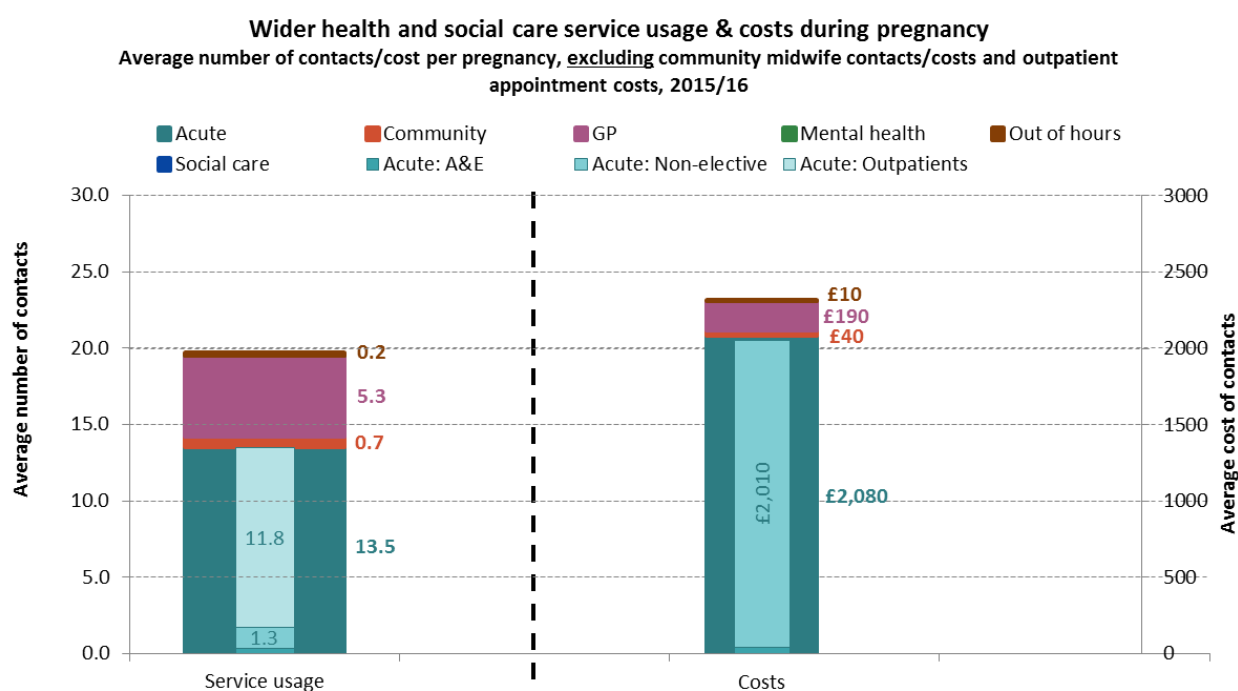
Source: Kent Integrated Dataset, prepared by KPHO (RK), December 2016

On average pregnant women have 11.8 outpatient appointments, 1.3 non-elective hospital admissions and 5.3 contacts with their GP during pregnancy, at a cost of £2,010 for the non-elective hospital admissions and £190 for the GP contacts. Cost data is not currently available for obstetric outpatient appointments.

Maternity needs assessment, March 2017

This analysis yielded a higher than anticipated average number of outpatient appointments per pregnancy, at 11.8. The chart below provides an analysis of the distribution of the numbers of outpatient contacts per pregnancy. There is no evidence to suggest a particularly skewed distribution, with the median and modal values both standing at 12.

Outpatient Appointments
Number of outpatient appointments per pregnancy, 2015/16

Source: Kent Integrated Dataset, prepared by KPHO (RK), January 2017

Maternity needs assessment, March 2017
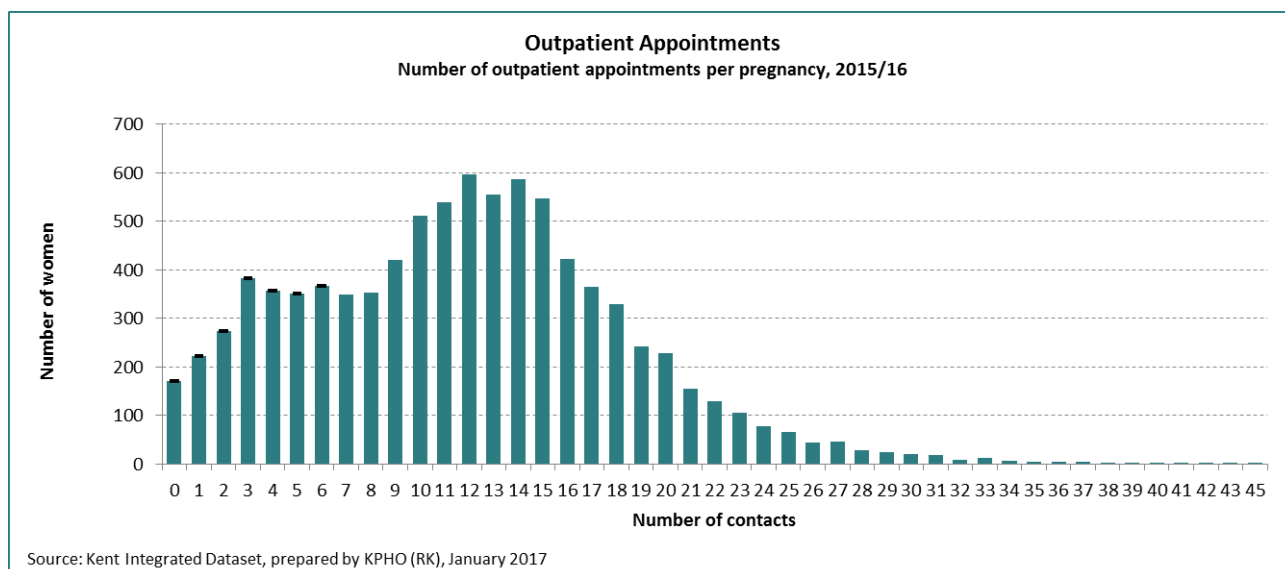
6.1.1 Service usage & costs during pregnancy: By demographics

The chart below suggests that wider health and social care service usage during pregnancy in terms of the number of contacts is similar regardless of age.
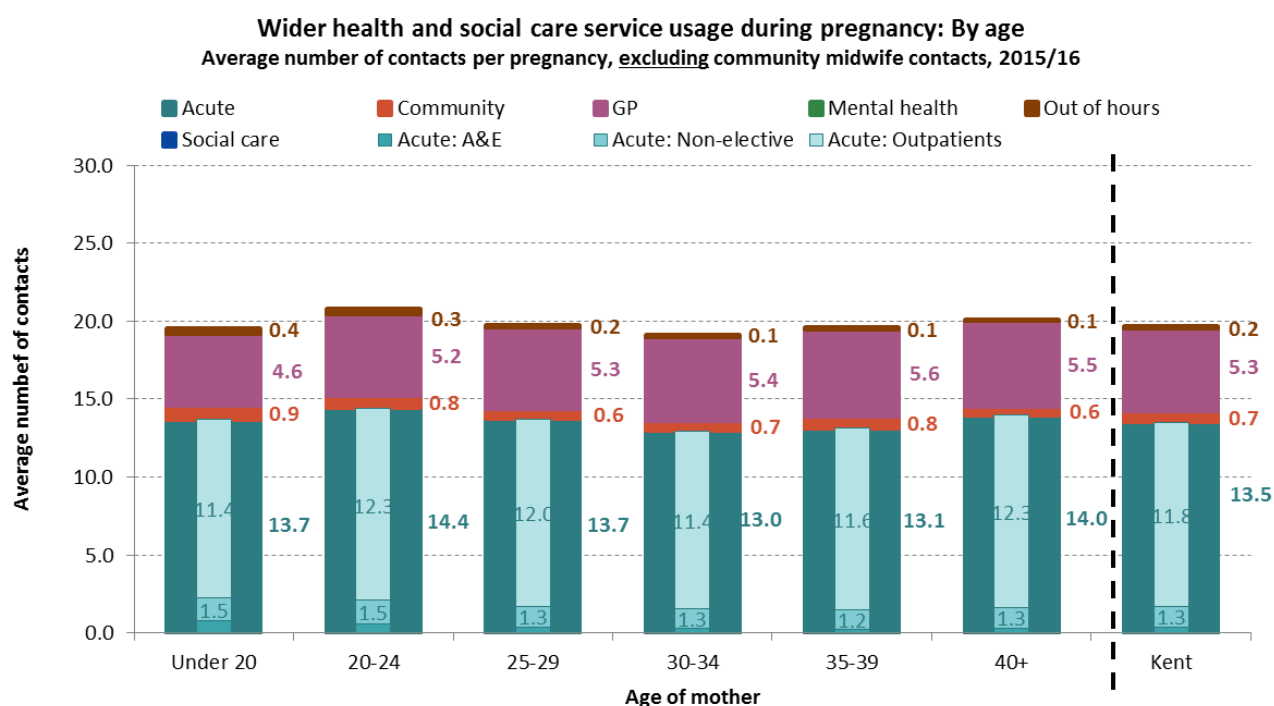
Wider health and social care service usage during pregnancy: By age
Average number of contacts per pregnancy, <u>excluding</u> community midwife contacts, 2015/16

Source: Kent Integrated Dataset, prepared by KPHO (RK), December 2016

A similar analysis of the costs of service usage also demonstrates no significant differences by age. It should be noted that these costs exclude both community midwife and outpatient activity.

Cost of service usage during pregnancy: By age
Average cost per pregnancy, 2015/16

Source: Kent Integrated Dataset, prepared by KPHO (RK), December 2016

Maternity needs assessment, March 2017
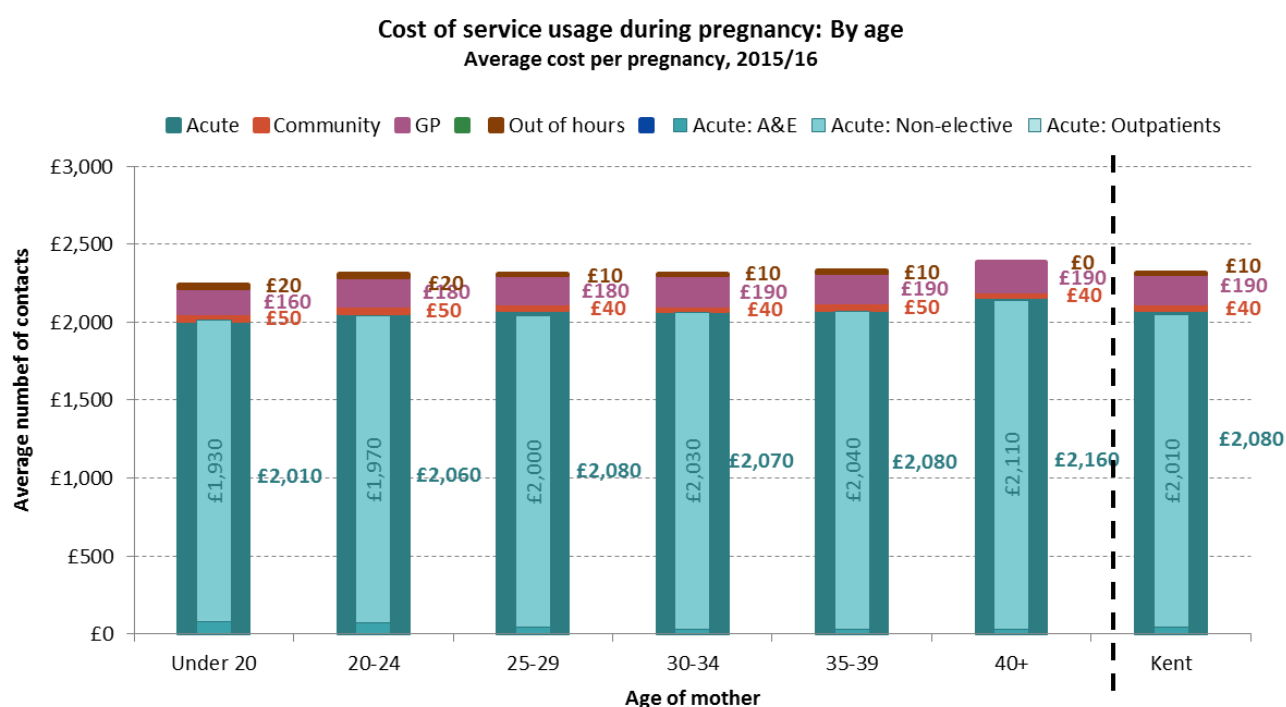
There are differences evident across Kent, with women living in the West having less outpatient appointments recorded than elsewhere, but more GP appointments. The difference is particularly marked between East and West.

Wider health and social care service usage during pregnancy: By geography
Average number of contacts per pregnancy, <u>excluding</u> community midwife contacts, 2015/16

Source: Kent Integrated Dataset, prepared by KPHO (RK), December 2016

Analysis of the costs of service usage demonstrates higher costs per pregnancy in the West in comparison with the East, despite lower numbers of contacts overall. It should be noted that these costs exclude both community midwife and outpatient activity.

Cost of wider health and social care service usage during pregnancy: By geography
Average cost per pregnancy, <u>excluding</u> community midwife contacts and outpatient appointments, 2015/16

Source: Kent Integrated Dataset, prepared by KPHO (RK), December 2016

Maternity needs assessment, March 2017
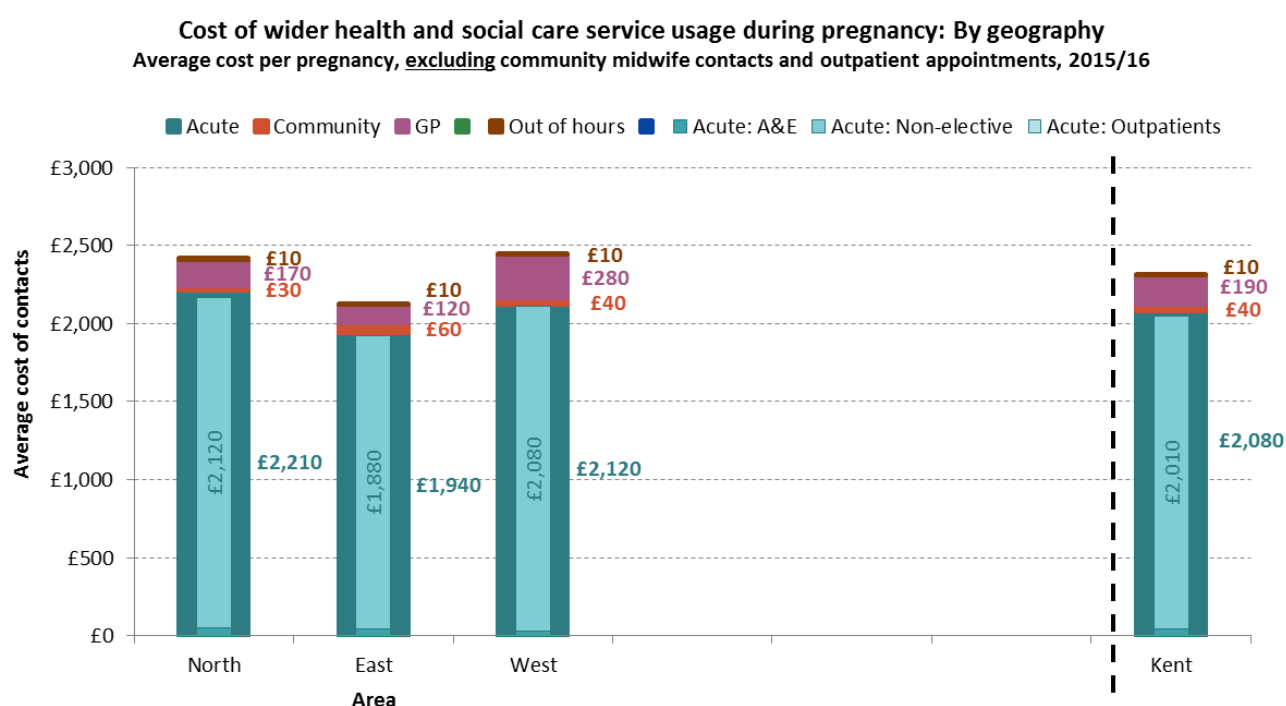
There is some evidence to suggest that wider health and social care service usage is slightly higher amongst those living in more deprived areas. This result also holds separately for both the North and West of Kent, but is less clear in the East. Here service usage appears to be more uniform across deprivation groups.
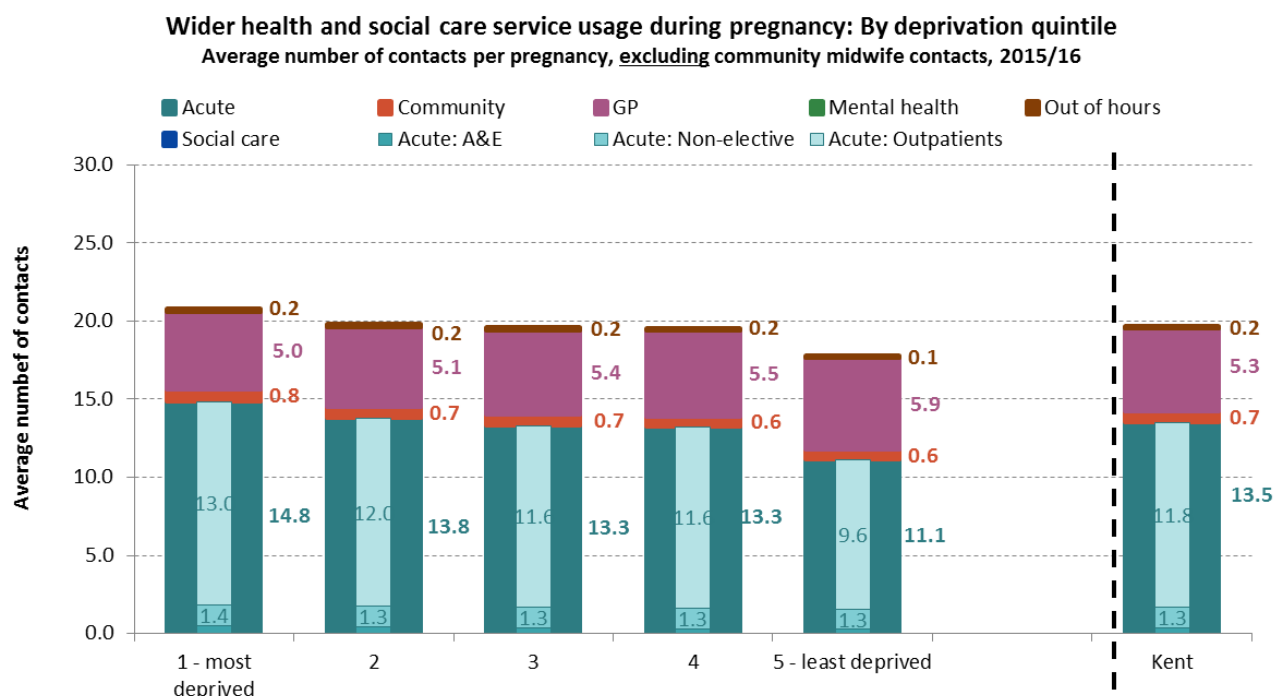
Wider health and social care service usage during pregnancy: By deprivation quintile
Average number of contacts per pregnancy, _excluding_ community midwife contacts, 2015/16

Source: Kent Integrated Dataset, prepared by KPHO (RK), December 2016

A similar analysis of the costs of service usage demonstrate little difference by deprivation. It should be noted that these costs exclude both community midwife and outpatient activity.

Cost of wider health and social care service usage during pregnancy: By deprivation quintile
Average costs per pregnancy, _excluding_ community midwife contacts and outpatient appointments, 2015/16

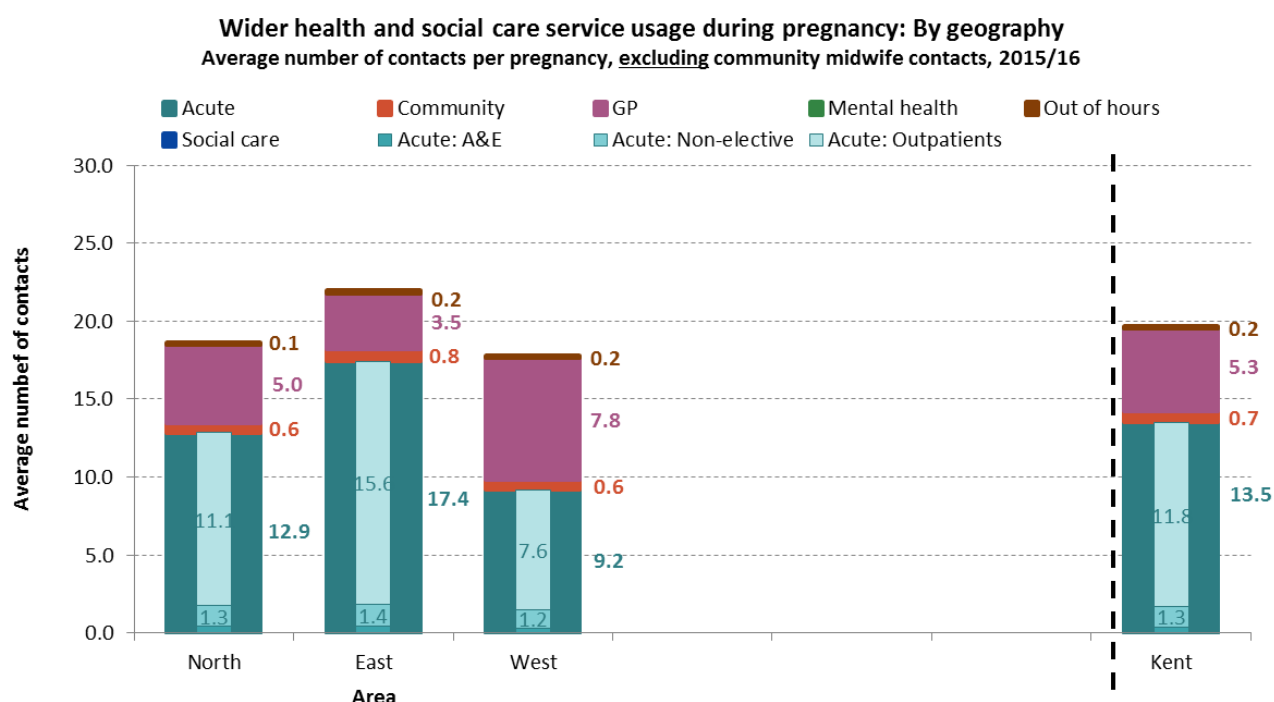Source: Kent Integrated Dataset, prepared by KPHO (RK), December 2016

6.1.2   Service usage & costs during pregnancy: By lifestyle

The chart below provides an analysis of wider health and social care service usage by smoking status and BMI prior to pregnancy[7] and suggests slightly higher service usage amongst both smokers and those who are obese.
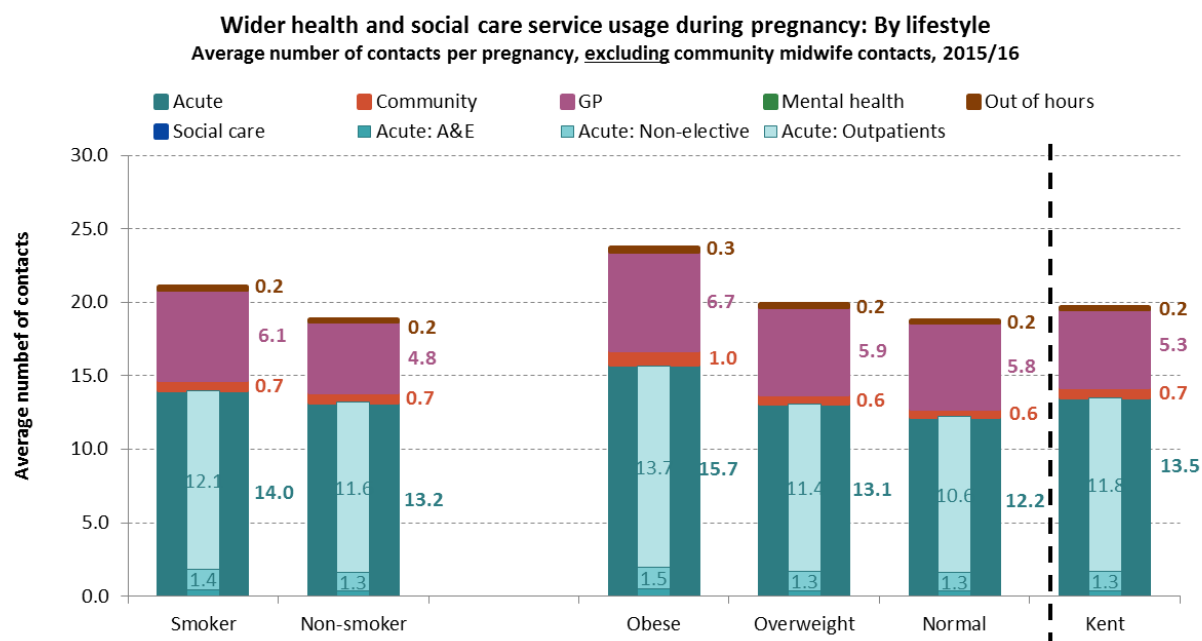
Wider health and social care service usage during pregnancy: By lifestyle
Average number of contacts per pregnancy, <u>excluding</u> community midwife contacts, 2015/16
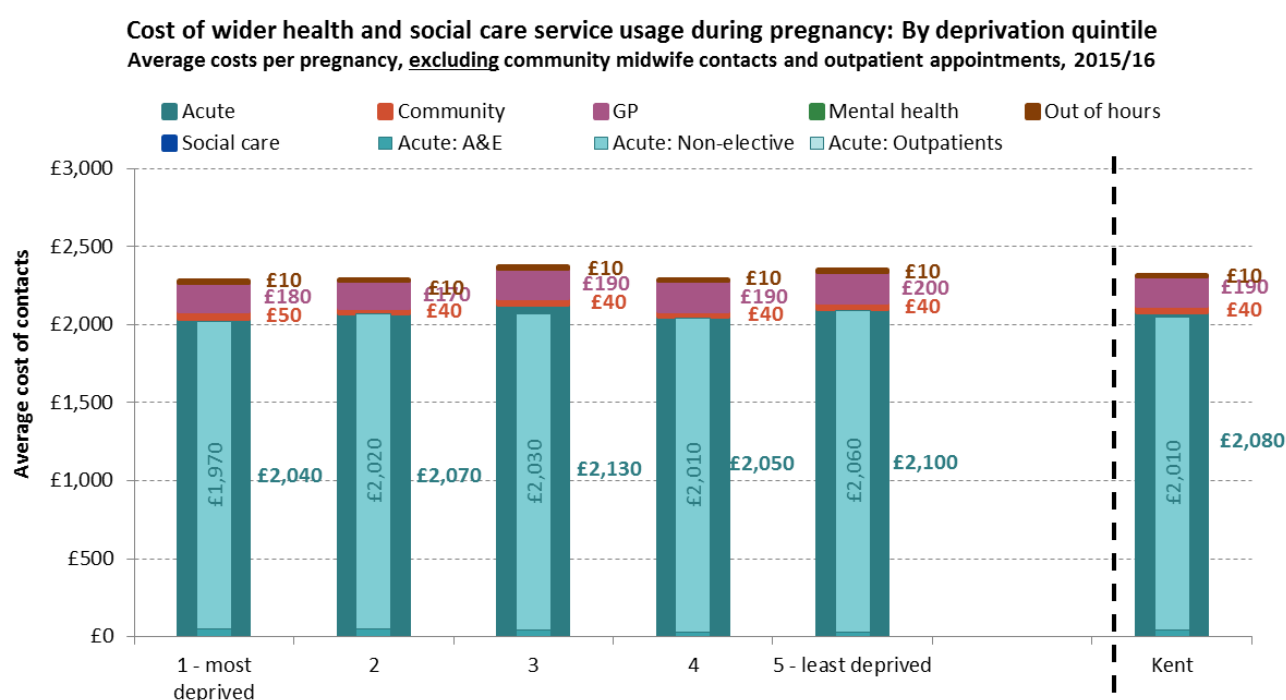

Source: Kent Integrated Dataset, prepared by KPHO (RK), December 2016

Analysis of the costs of wider health and social care service usage also demonstrate higher costs per pregnancy for obese women, mainly due to higher acute care costs. It should be noted that these costs exclude both community midwife and outpatient activity.

Cost of wider health and social care service usage during pregnancy: By lifestyle
Average cost per pregnancy, <u>excluding</u> community midwife contacts and outpatient appointments, 2015/16
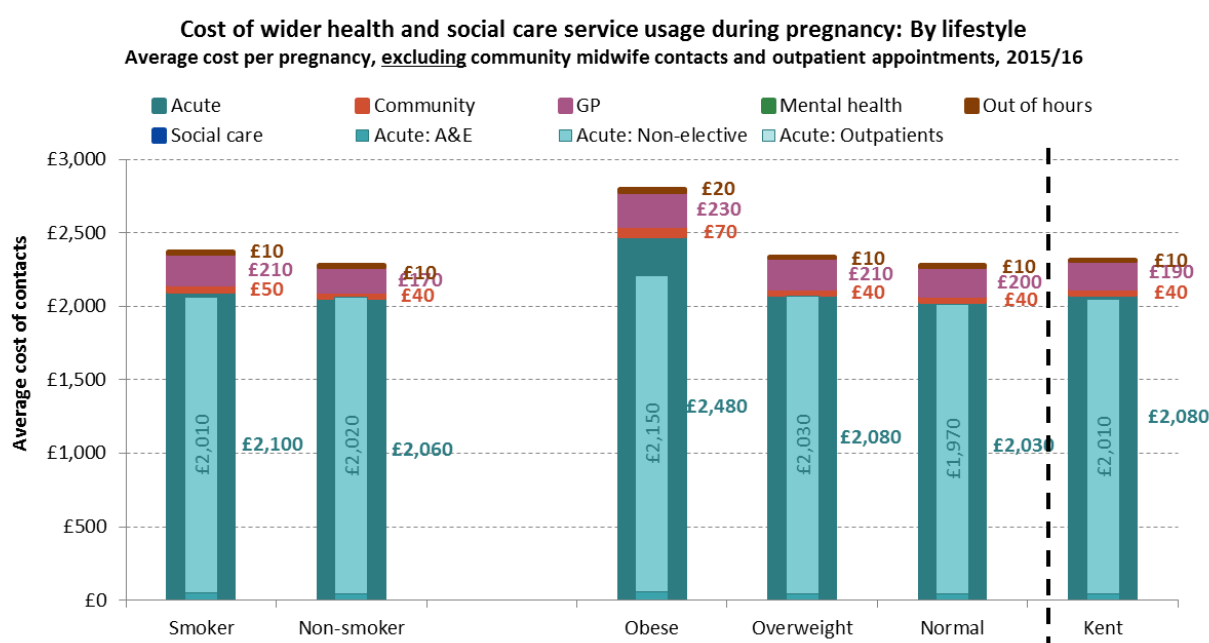
Source: Kent Integrated Dataset, prepared by KPHO (RK), December 2016

[7] Only pregnant women with a BMI recorded by their GP within the 12 months prior to conception or the first 3 months of pregnancy are covered by this analysis.

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6.1.3   Service usage & costs during pregnancy: By long term conditions

Wider health and social care service usage increases as the number of pre-existing long term conditions increases. Service usage increased at a similar rate for those with pre-existing mental health conditions as those with pre-existing respiratory conditions.

Wider health and social care service usage during pregnancy: By number of pre-existing long term conditions
Average number of contacts per pregnancy, excluding community midwife contacts, 2015/16

Source: Kent Integrated Dataset, prepared by KPHO (RK), December 2016

Wider health and social care service usage during pregnancy: By long term condition
Average number of contacts per pregnancy, excluding community midwife contacts, 2015/16

Source: Kent Integrated Dataset, prepared by KPHO (RK), December 2016

Maternity needs assessment, March 2017
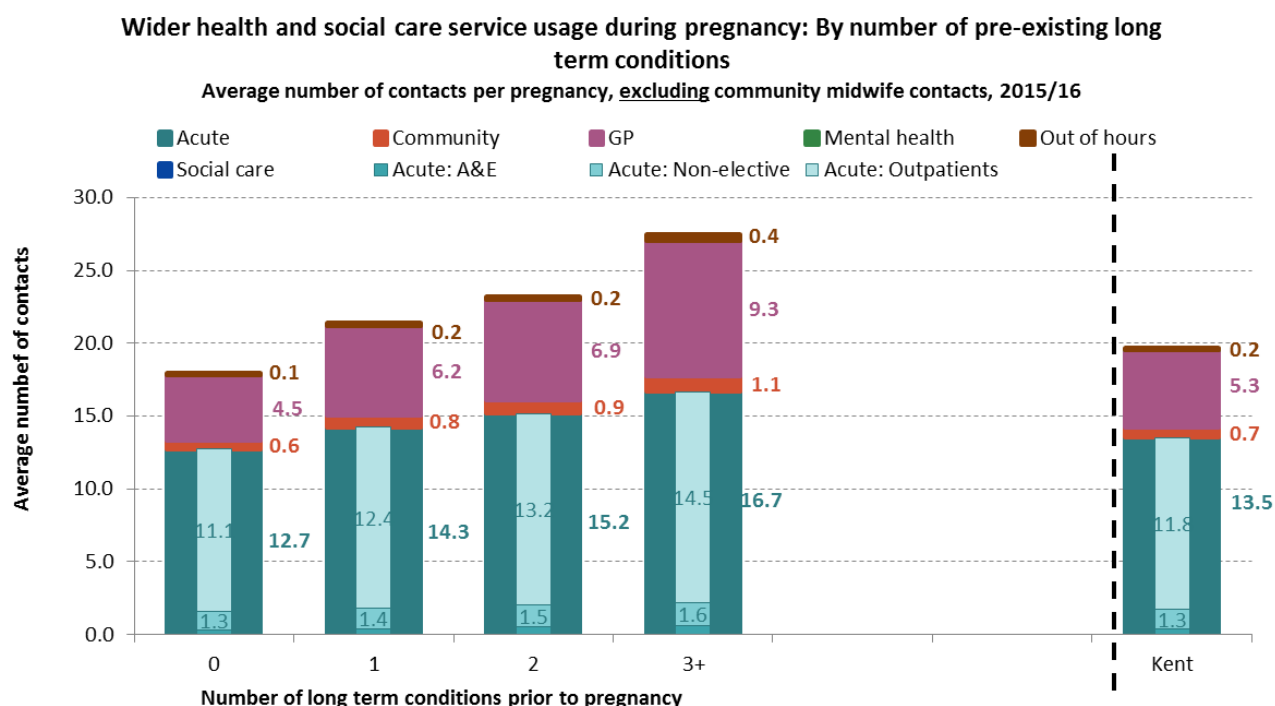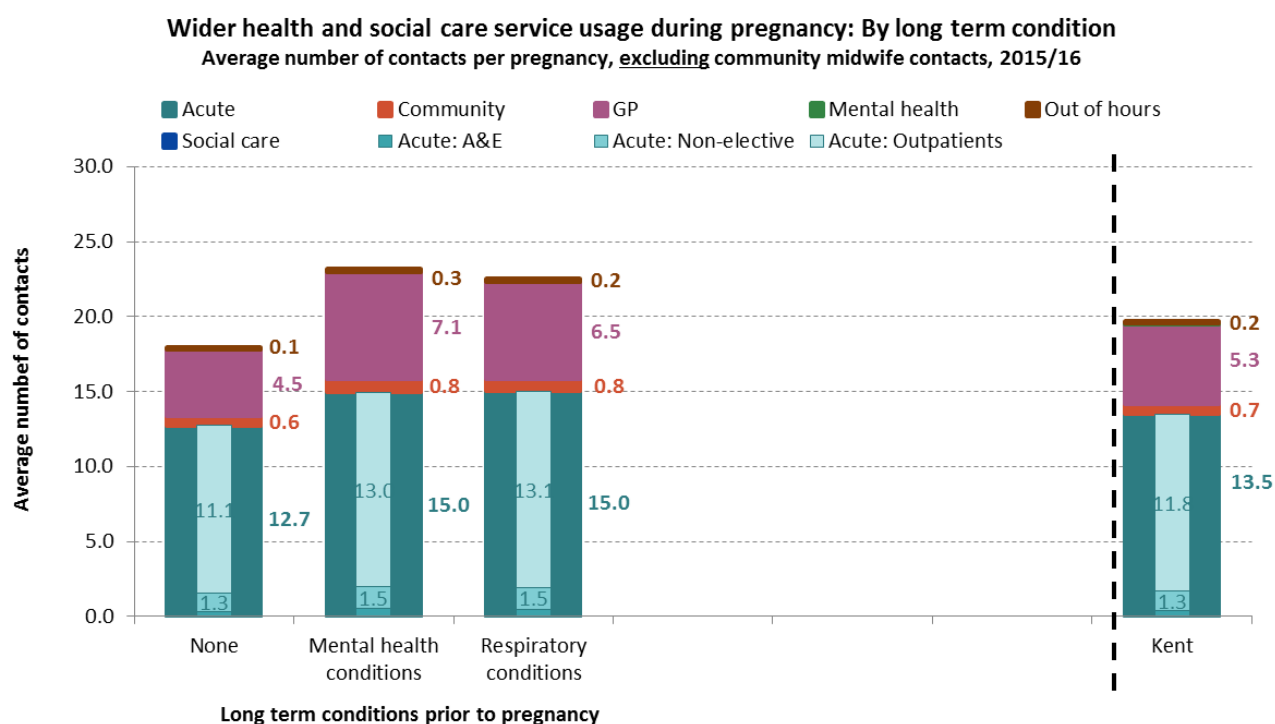
Analysis of the costs of wider health and social care service usage also demonstrate slightly higher costs per pregnancy for those with more long term conditions, with the cost increase similar for those with pre-existing mental health conditions as those with pre-existing respiratory conditions. It should be noted that these costs exclude both community midwife and outpatient activity.

Cost of wider health and social care service usage during pregnancy: By number of pre-existing long term conditions

Average cost per pregnancy, excluding community midwife contacts and outpatient appointments, 2015/16

Source: Kent Integrated Dataset, prepared by KPHO (RK), December 2016

Cost of wider health and social care service usage during pregnancy: By long term condition

Average number of contacts per pregnancy, excluding community midwife contacts and outpatient appointments, 2015/16

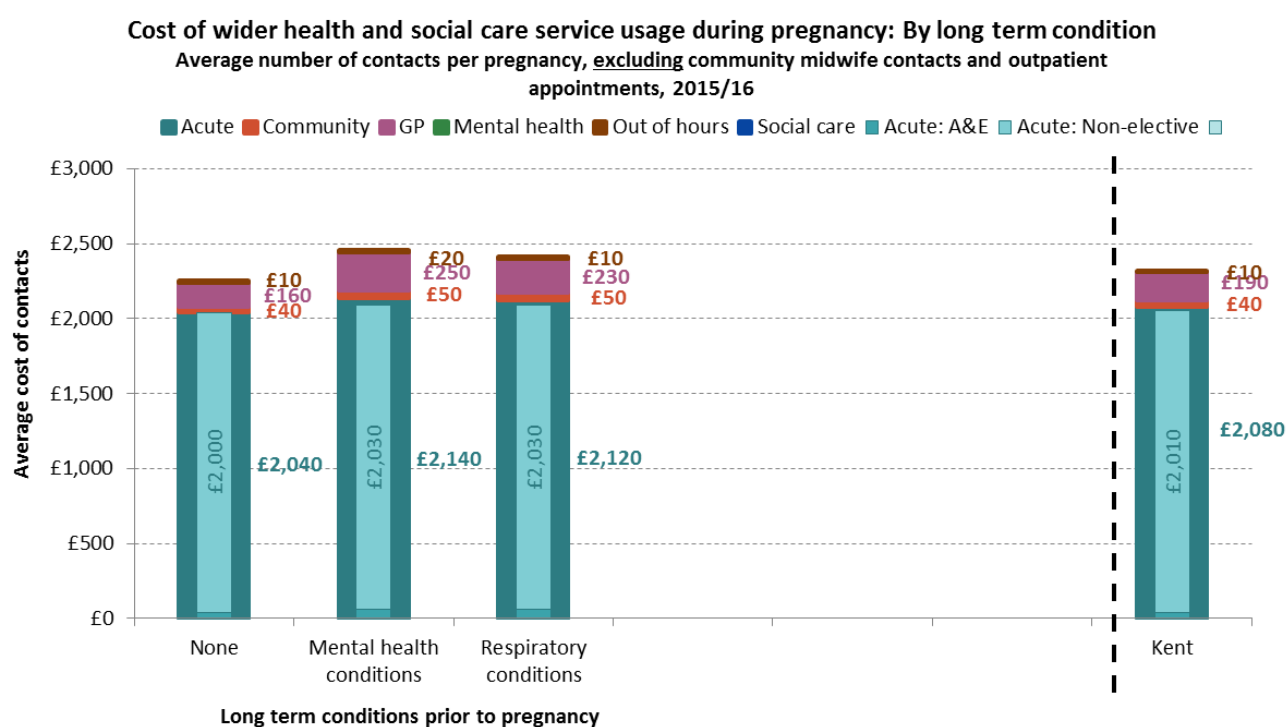Source: Kent Integrated Dataset, prepared by KPHO (RK), December 2016

Maternity needs assessment, March 2017
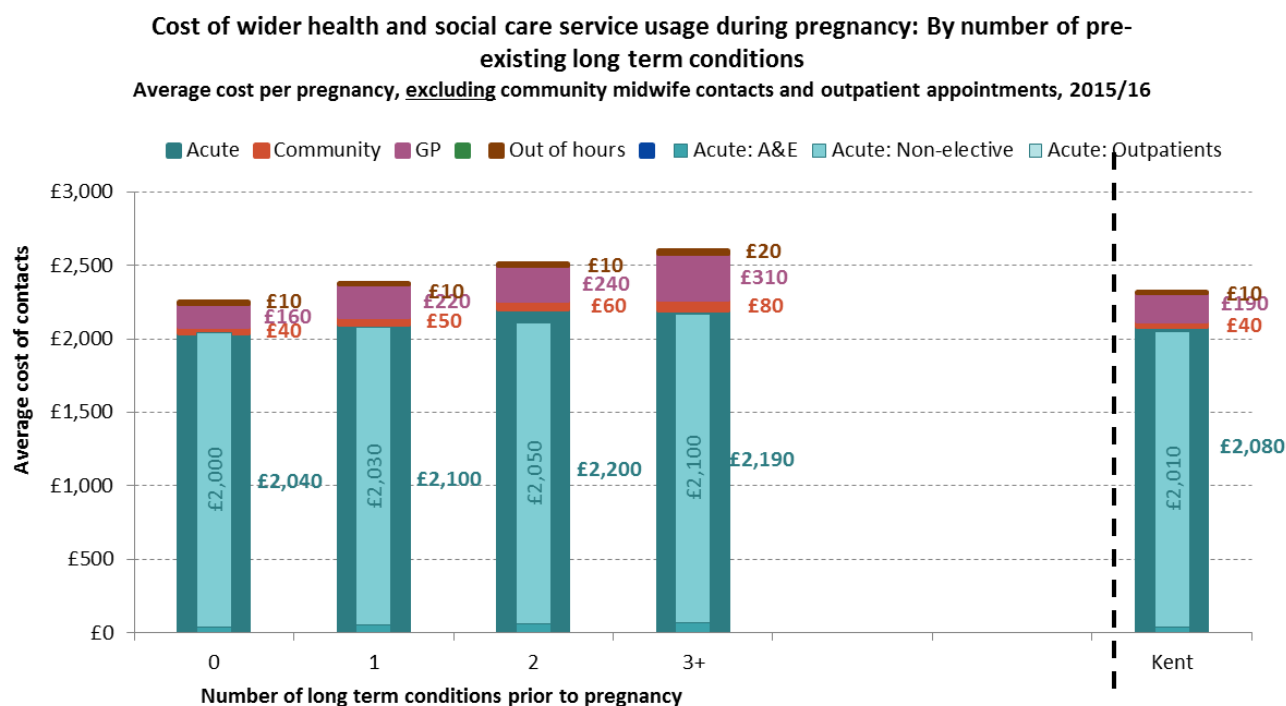
6.2   Wider health and social care service usage & costs after pregnancy

This analysis covers usage by both mother and baby of wider health and social care services in the six months following the birth.

As in the previous section, the analysis covers usage of acute services (including A&E attendances, elective and non-elective hospital admissions and outpatient appointments), usage of some community services (mainly health visitors), GP contacts (surgery appointments, telephone contacts and home visits), mental health contacts, out of hours service contacts and contacts with adult social services.   The analysis excludes community midwife appointments.

For consistency with the analysis of costs during pregnancy, outpatient appointment costs have also been excluded from the post-pregnancy cost analysis.

Please note that all of analysis in this section is again restricted to those women registered with GPs participating in the KID.

Wider health and social care service usage & costs after pregnancy: Mother & baby
Average number of contacts/cost per pregnancy in the six months following delivery, excluding community midwife contacts/costs and outpatient appointment costs, 2015/16

Source: Kent Integrated Dataset, prepared by KPHO (RK), January 2017

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Wider health and social care service usage & costs after pregnancy: Mother
Average number of contacts/cost per pregnancy in the six months following delivery, _excluding_ community midwife contacts/costs and outpatient appointment costs, 2015/16
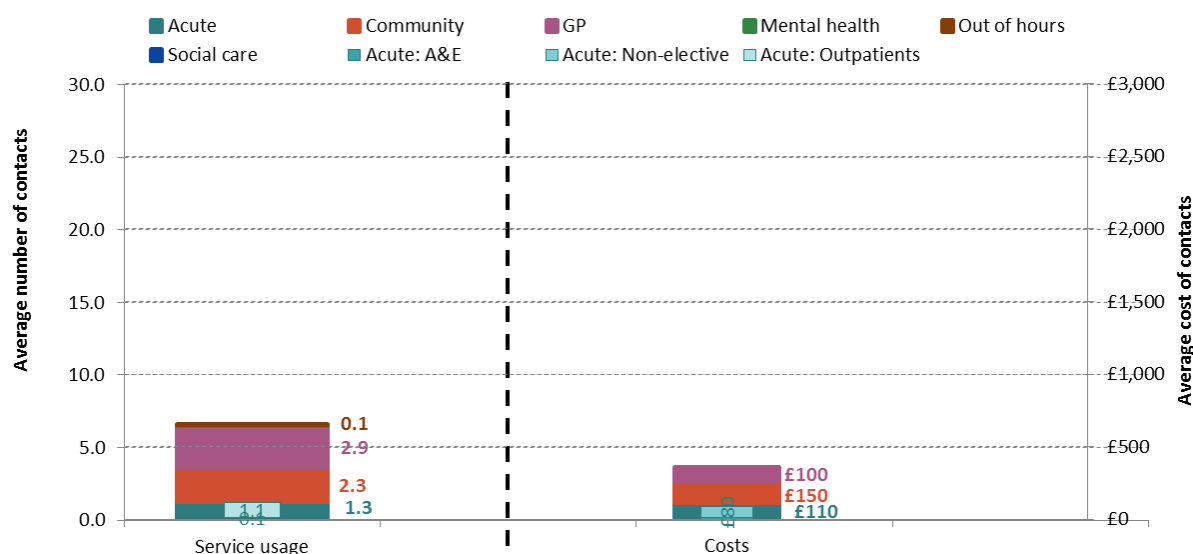
Source: Kent Integrated Dataset, prepared by KPHO (RK), January 2017

Wider health and social care service usage & costs after pregnancy: Baby
Average number of contacts/cost per pregnancy in the six months following delivery, _excluding_ community midwife contacts/costs and outpatient appointment costs, 2015/16
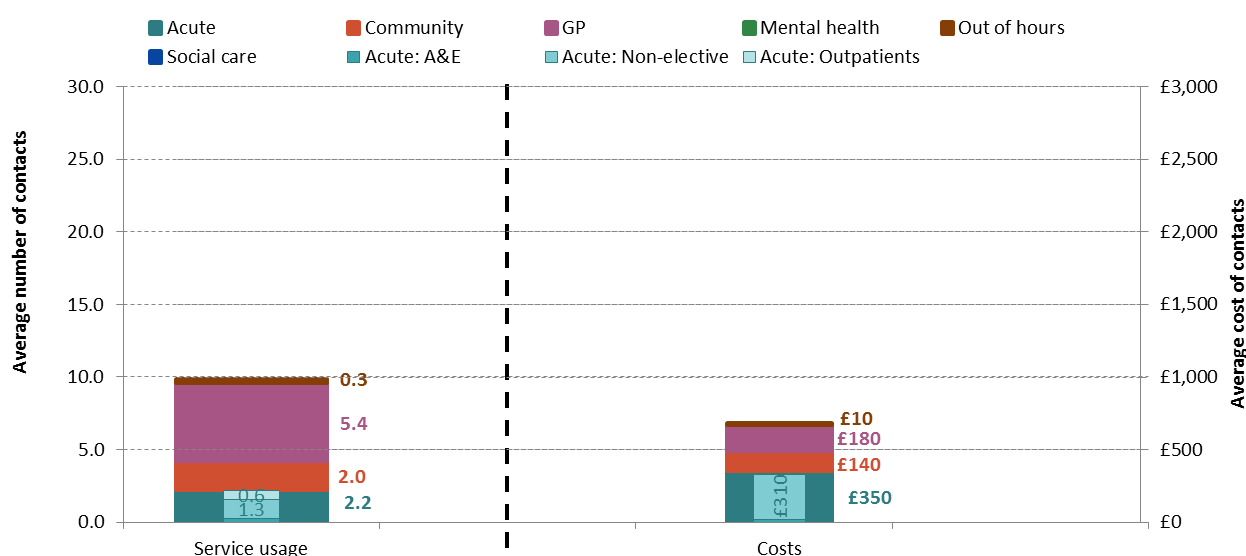
Source: Kent Integrated Dataset, prepared by KPHO (RK), January 2017

In the six months following delivery, both service usage and costs are higher for the babies than their mothers.

On average babies have 0.6 outpatient appointments, 1.3 non-elective hospital admissions, 5.4 contacts with their GP and 2.0 contacts with community services (mainly health visitors), at a cost of £310 for the non-elective hospital admissions, £180 for the GP contacts and £140 for the community contacts. Cost data is not shown for outpatient appointments.

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Their mothers have, on average, 1.1 outpatient appointments, 2.9 contacts with their GP and 2.3 contacts with community services, at a cost of £100 for the GP contacts and £150 for the community contacts. Cost data is not shown for outpatient appointments.

6.2.1 Service usage & costs after pregnancy: By demographics

The chart below suggests that wider health and social care service usage in the six months following pregnancy in terms of the number of contacts is similar regardless of the age of the mother.
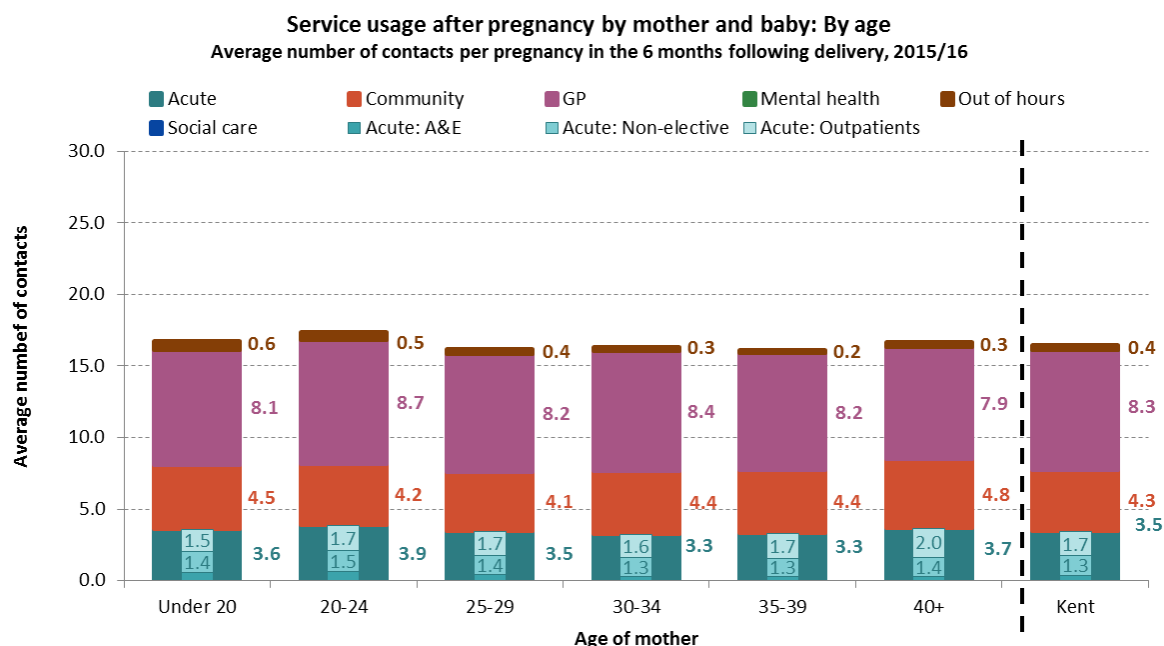
Service usage after pregnancy by mother and baby: By age
Average number of contacts per pregnancy in the 6 months following delivery, 2015/16
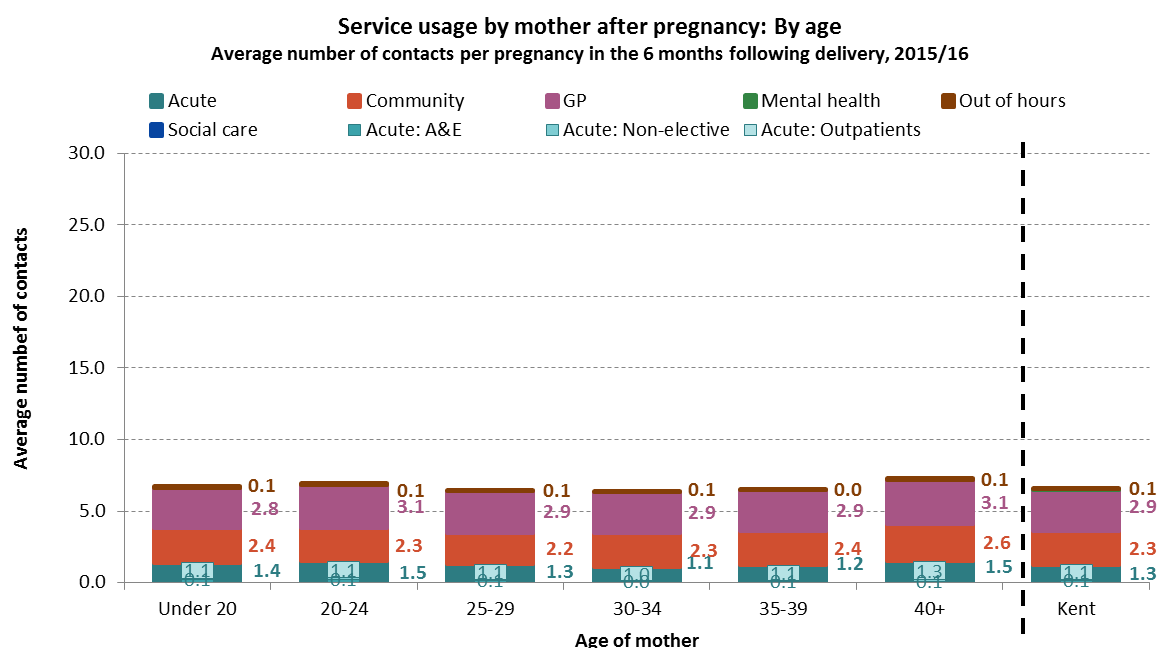
Source: Kent Integrated Dataset, prepared by KPHO (RK), January 2017

Service usage by mother after pregnancy: By age
Average number of contacts per pregnancy in the 6 months following delivery, 2015/16

Source: Kent Integrated Dataset, prepared by KPHO (RK), January 2017

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Service usage by baby: By age
Average number of contacts per pregnancy in the 6 months following delivery, 2015/16

■ Acute ■ Community ■ GP ■ Mental health ■ Out of hours
■ Social care ■ Acute: A&E ■ Acute: Non-elective ■ Acute: Outpatients
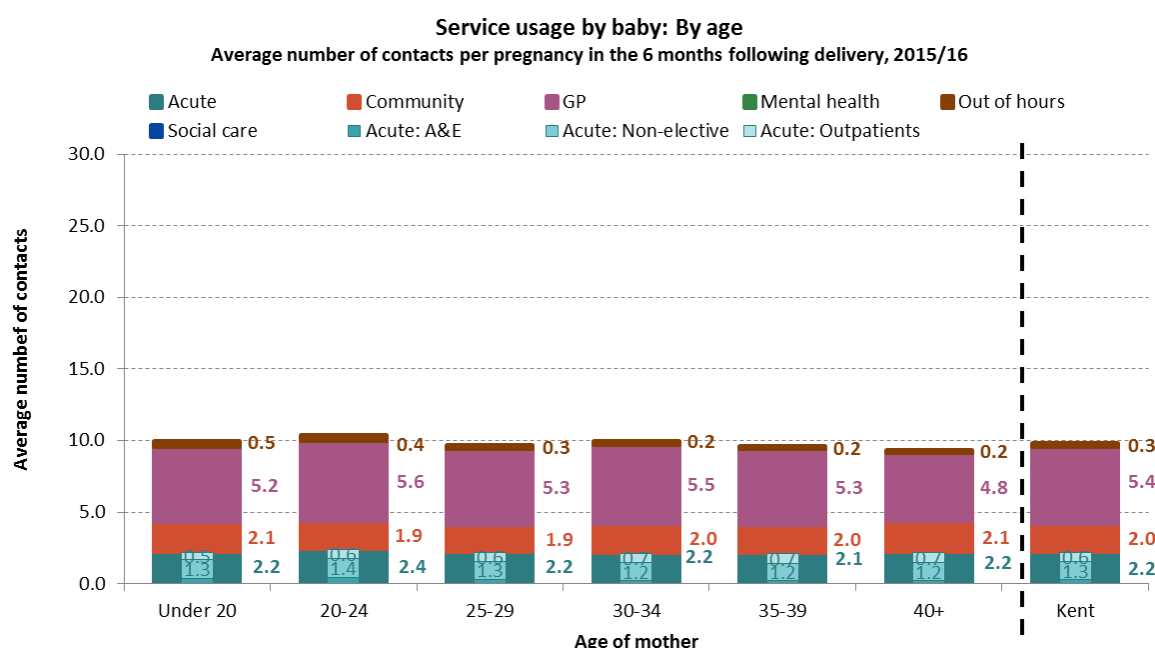
Source: Kent Integrated Dataset, prepared by KPHO (RK), January 2017

A similar analysis of the costs of service usage suggests that acute costs may be slightly higher for younger mothers. It should be noted that these costs exclude both community midwife and outpatient activity.

Cost of service usage after pregnancy by mother and baby: By age
Average cost per pregnancy in the 6 months following delivery, 2015/16

■ Acute ■ Community ■ GP ■ Out of hours ■ Acute: A&E ■ Acute: Non-elective ■ Acute: Outpatients

Source: Kent Integrated Dataset, prepared by KPHO (RK), January 2017

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Cost of service usage by mother after pregnancy: By age
Average cost per pregnancy in the 6 months following delivery, 2015/16

Legend: ■ Acute ■ Community ■ GP ■ Out of hours ■ Acute: A&E ■ Acute: Non-elective ■ Acute: Outpatients

Axis: Average costs (£0 – £3,000), Age of mother (Under 20, 20-24, 25-29, 30-34, 35-39, 40+, Kent)

Age	GP	Community	Outpatients
Under 20	£90	£150	£150
20-24	£100	£150	£150
25-29	£100	£140	£110
30-34	£100	£150	£70
35-39	£100	£150	£100
40+	£110	£170	£180
Kent	£100	£150	£110

Source: Kent Integrated Dataset, prepared by KPHO (RK), January 2017

Cost of service usage by baby: By age
Average cost per pregnancy in the 6 months following delivery, 2015/16

Legend: ■ Acute ■ Community ■ GP ■ Out of hours ■ Acute: A&E ■ Acute: Non-elective ■ Acute: Outpatients

Axis: Average costs (£0 – £3,000), Age of mother (Under 20, 20-24, 25-29, 30-34, 35-39, 40+, Kent)

Age	Out of hours	GP	Community	Outpatients
Under 20	£20	£180	£140	£440
20-24	£20	£190	£140	£460
25-29	£10	£180	£130	£380
30-34	£10	£190	£140	£310
35-39	£10	£180	£140	£290
40+	£10	£170	£150	£300
Kent	£10	£180	£140	£350

Source: Kent Integrated Dataset, prepared by KPHO (RK), January 2017

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There are differences evident across Kent, with mothers and babies living in the East appearing to have less contact with their GP and community services recorded than elsewhere.
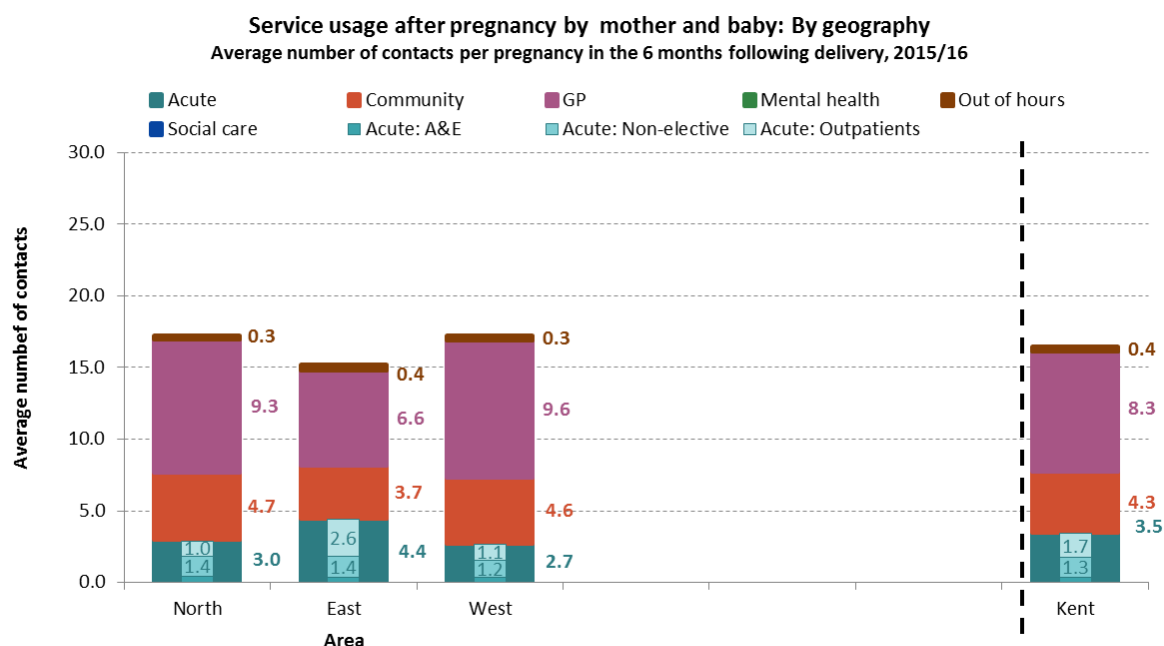
Service usage after pregnancy by mother and baby: By geography
Average number of contacts per pregnancy in the 6 months following delivery, 2015/16
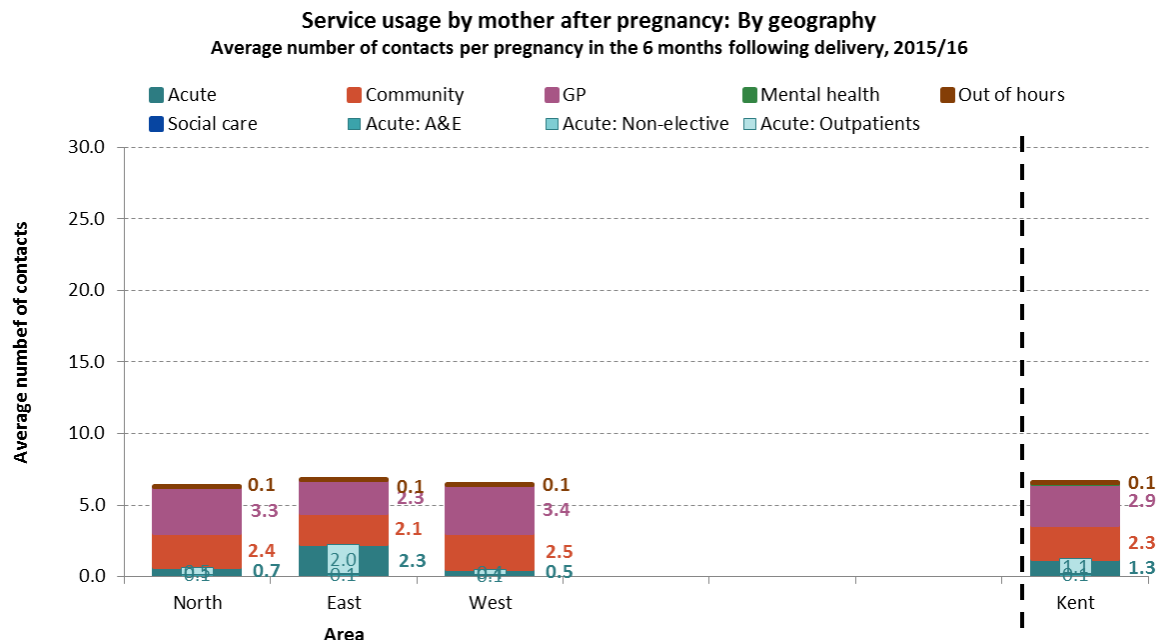
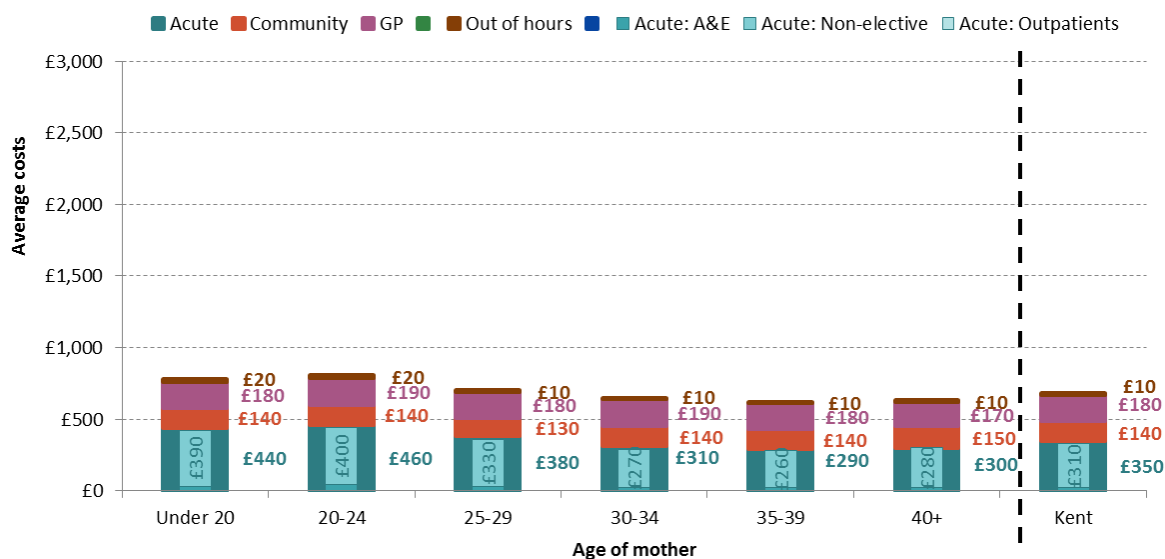Source: Kent Integrated Dataset, prepared by KPHO (RK), January 2017

Service usage by mother after pregnancy: By geography
Average number of contacts per pregnancy in the 6 months following delivery, 2015/16

Source: Kent Integrated Dataset, prepared by KPHO (RK), January 2017

Maternity needs assessment, March 2017

Service usage by baby: By geography
Average number of contacts per pregnancy in the 6 months following delivery, 2015/16

Source: Kent Integrated Dataset, prepared by KPHO (RK), January 2017

Analysis of the costs of service usage demonstrates lower costs per pregnancy in the East for both GP and community services, reflecting the lower numbers of contacts overall. It should be noted that these costs exclude both community midwife and outpatient activity.

Cost of service usage after pregnancy by mother and baby: By geography
Average cost per pregnancy in the 6 months following delivery, 2015/16

Source: Kent Integrated Dataset, prepared by KPHO (RK), January 2017

Maternity needs assessment, March 2017

Cost of service usage by mother after pregnancy: By geography
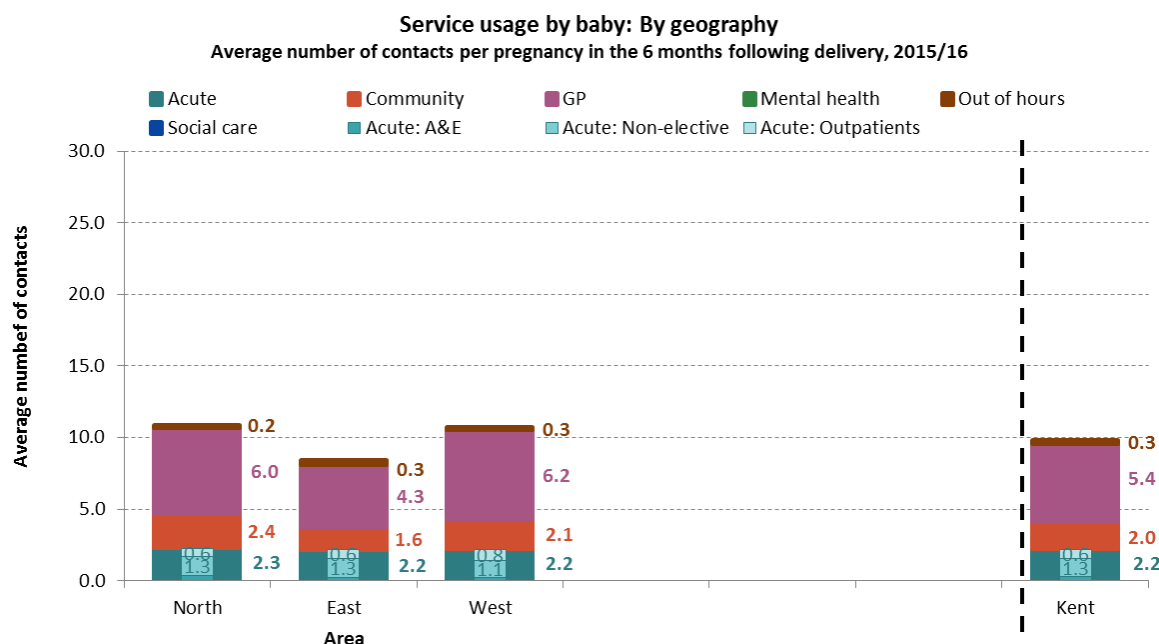### Average cost per pregnancy in the 6 months following delivery, 2015/16

Legend: Acute | Community | GP | Out of hours | Acute: A&E | Acute: Non-elective | Acute: Outpatients

North: £110, £150, £100

East: £80, £140, £100

West: £120, £160, £120

Kent: £100, £150, £110

Source: Kent Integrated Dataset, prepared by KPHO (RK), January 2017

Cost of service usage by baby: By geography
Average cost per pregnancy in the 6 months following delivery, 2015/16

Legend: Acute | Community | GP | Out of hours | Acute: A&E | Acute: Non-elective | Acute: Outpatients

North: £0, £200, £160, £410, £480

East: £20, £150, £110, £290, £320

West: £10, £210, £150, £240, £280

Kent: £10, £180, £140, £310, £350
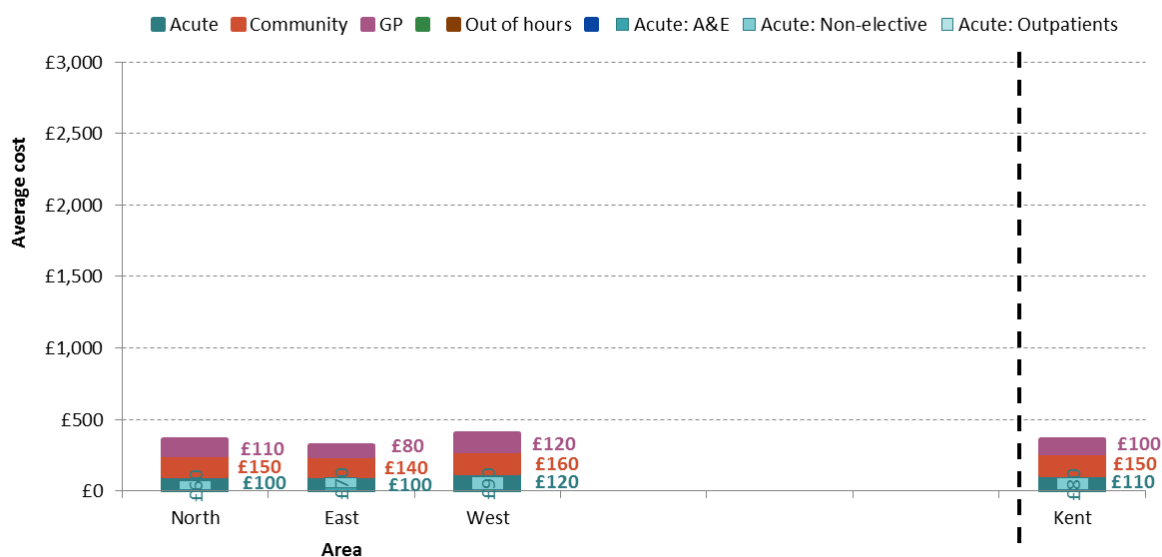
Source: Kent Integrated Dataset, prepared by KPHO (RK), January 2017

Maternity needs assessment, March 2017

The chart below suggests that wider health and social care service usage in the six months following pregnancy in terms of the number of contacts does not differ across deprivation groups.

Service usage after pregnancy by mother and baby: By deprivation quintile
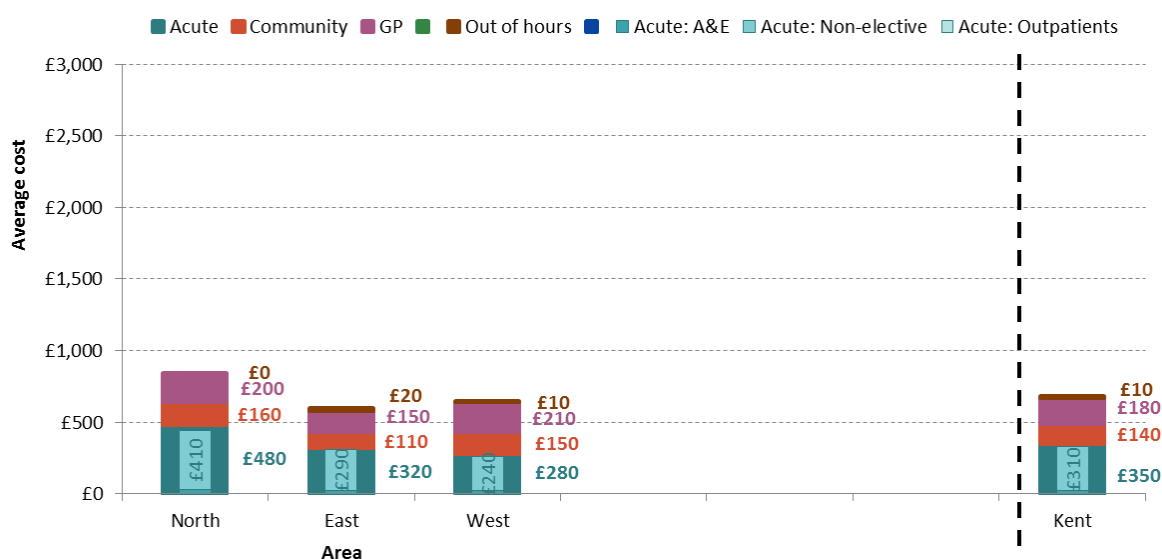Average number of contacts per pregnancy in the 6 months following delivery, 2015/16
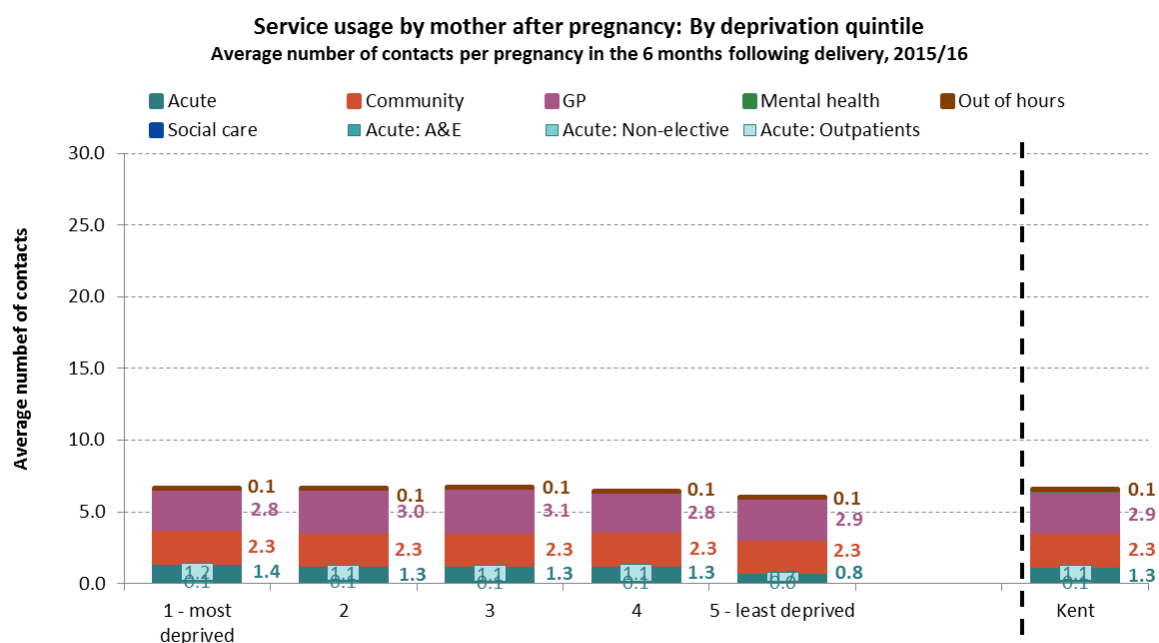
Source: Kent Integrated Dataset, prepared by KPHO (RK), January 2017

Service usage by mother after pregnancy: By deprivation quintile
Average number of contacts per pregnancy in the 6 months following delivery, 2015/16

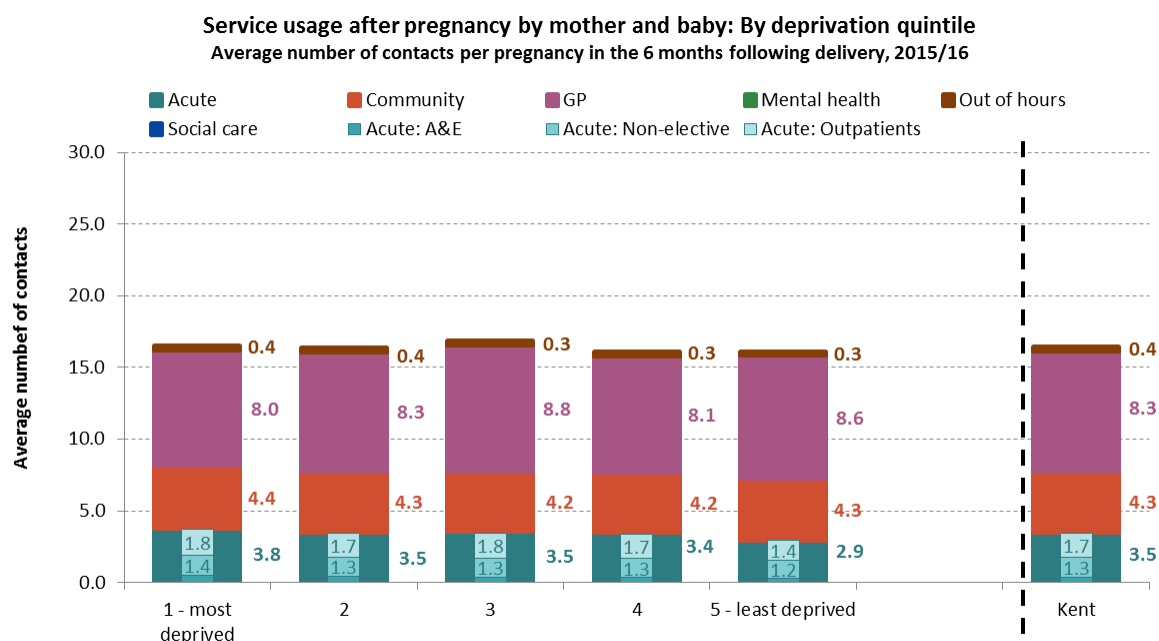Source: Kent Integrated Dataset, prepared by KPHO (RK), January 2017

Maternity needs assessment, March 2017

Service usage by baby: By deprivation quintile
Average number of contacts per pregnancy in the 6 months following delivery, 2015/16

Source: Kent Integrated Dataset, prepared by KPHO (RK), January 2017

A similar analysis of the costs of service usage suggests that acute costs may be higher for mothers and babies living in more deprived areas, despite the number of hospital admissions being similar. It should be noted that these costs exclude both community midwife and outpatient activity.

Cost of service usage after pregnancy by mother and baby: By deprivation quintile
Average costs per pregnancy in the 6 months following delivery, 2015/16

Source: Kent Integrated Dataset, prepared by KPHO (RK), January 2017

Maternity needs assessment, March 2017

Cost of service usage by mother after pregnancy: By deprivation quintile
Average costs per pregnancy in the 6 months following delivery, 2015/16

Source: Kent Integrated Dataset, prepared by KPHO (RK), January 2017
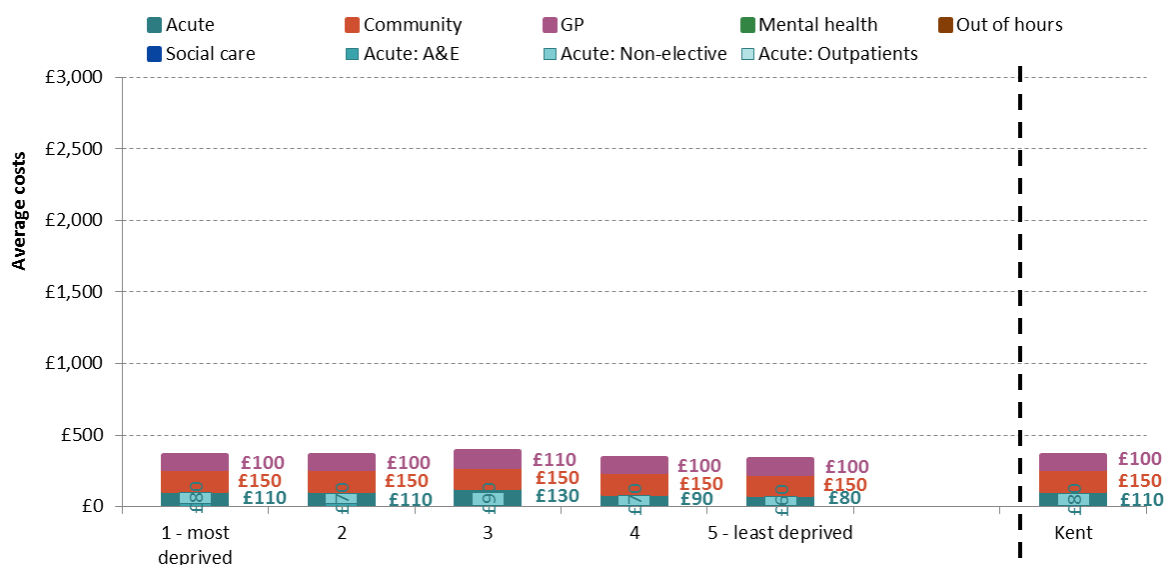
Cost of service usage by baby: By deprivation quintile
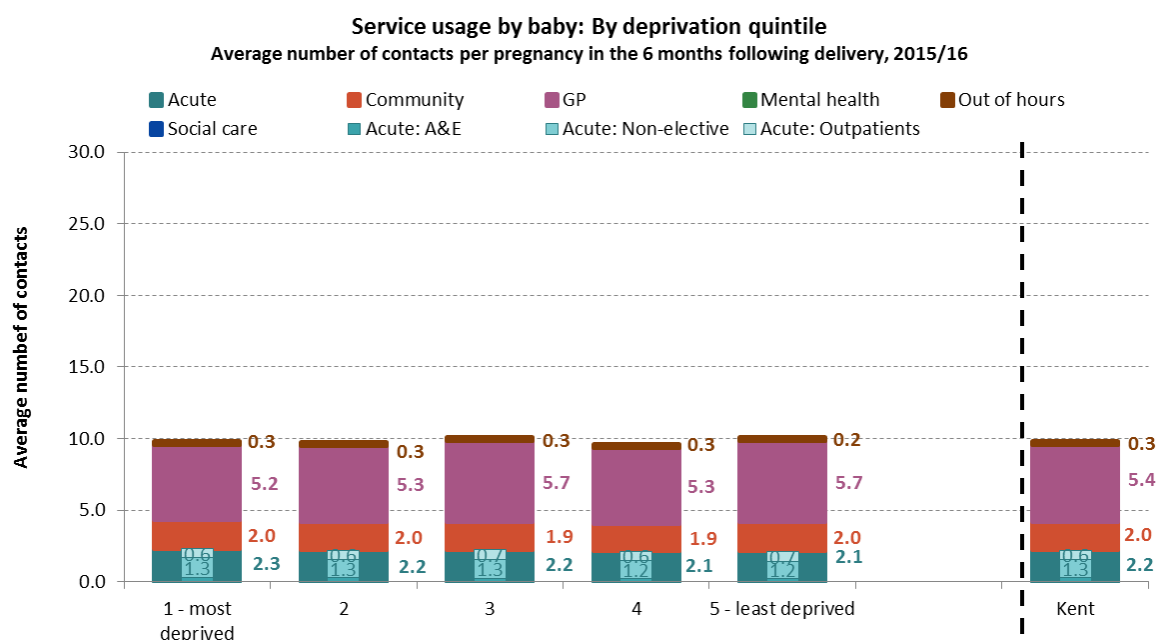### Average costs per pregnancy in the 6 months following delivery, 2015/16

Source: Kent Integrated Dataset, prepared by KPHO (RK), January 2017
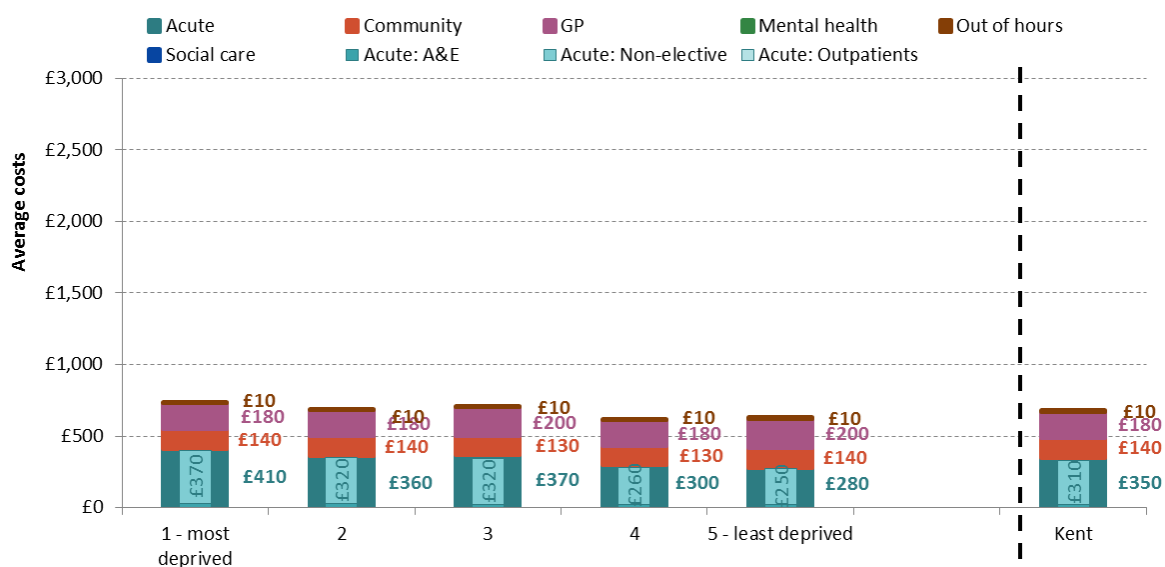
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6.2.2 Service usage & costs after pregnancy: By lifestyle

The chart below provides an analysis of wider health and social care service usage by smoking status and BMI prior to pregnancy[8] and suggests slightly higher service usage for both mum and baby where the mother smokes or is obese.

Service usage after pregnancy by mother and baby: By lifestyle
Average number of contacts per pregnancy in the 6 months following delivery, 2015/16

Source: Kent Integrated Dataset, prepared by KPHO (RK), January 2017

Service usage by mother after pregnancy: By lifestyle
Average number of contacts per pregnancy in the 6 months following delivery, 2015/16
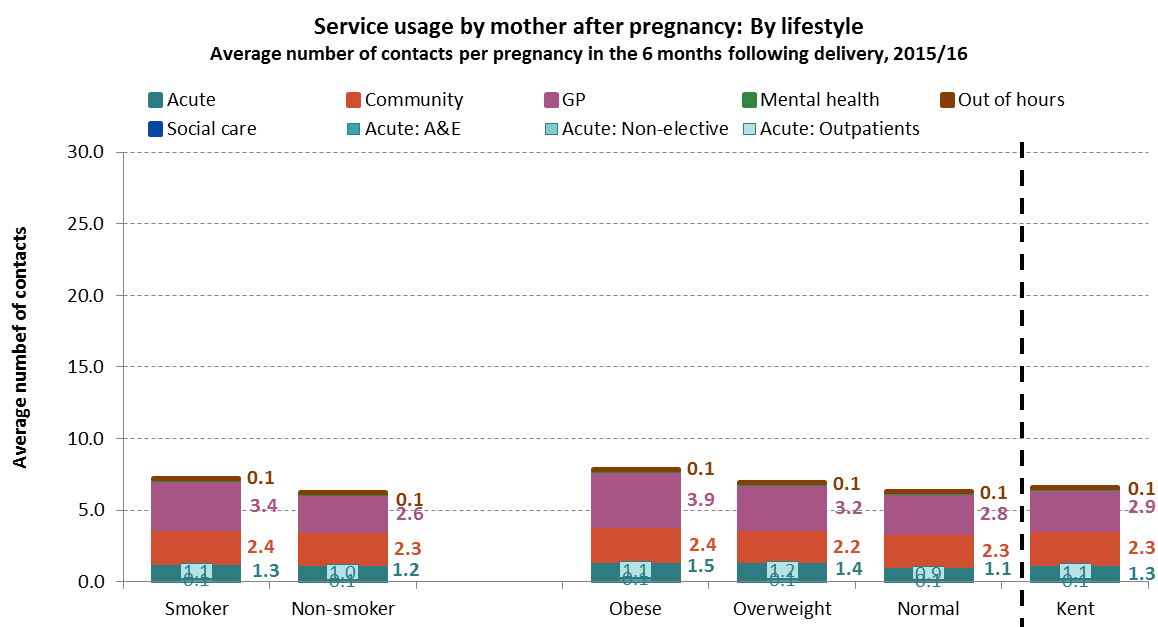
Source: Kent Integrated Dataset, prepared by KPHO (RK), January 2017

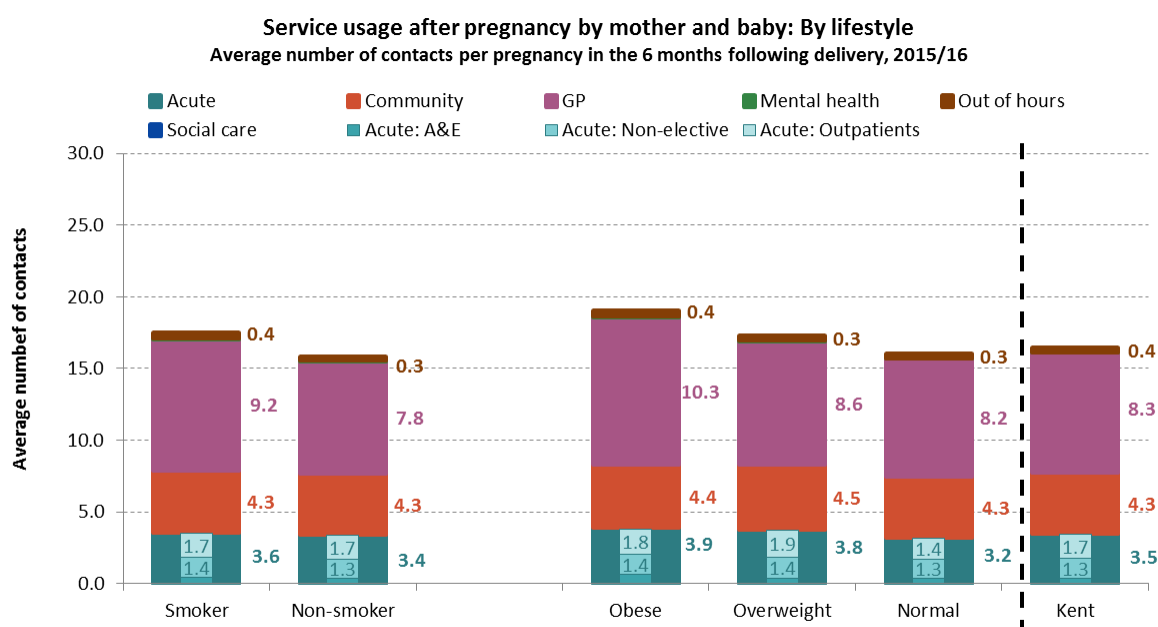[8] Only pregnant women with a BMI recorded by their GP within the 12 months prior to conception or the first 3 months of pregnancy are covered by this analysis.

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Service usage by baby: By lifestyle
Average number of contacts per pregnancy in the 6 months following delivery, 2015/16

Legend: Acute, Community, GP, Mental health, Out of hours, Social care, Acute: A&E, Acute: Non-elective, Acute: Outpatients

Category	Out of hours	GP	Community	Acute
Smoker	0.3	5.7	2.0	2.2
Non-smoker	0.3	5.2	2.0	2.2
Obese	0.3	6.4	2.0	2.4
Overweight	0.3	5.4	2.3	2.4
Normal	0.3	5.4	2.0	2.1
Kent	0.3	5.4	2.0	2.2
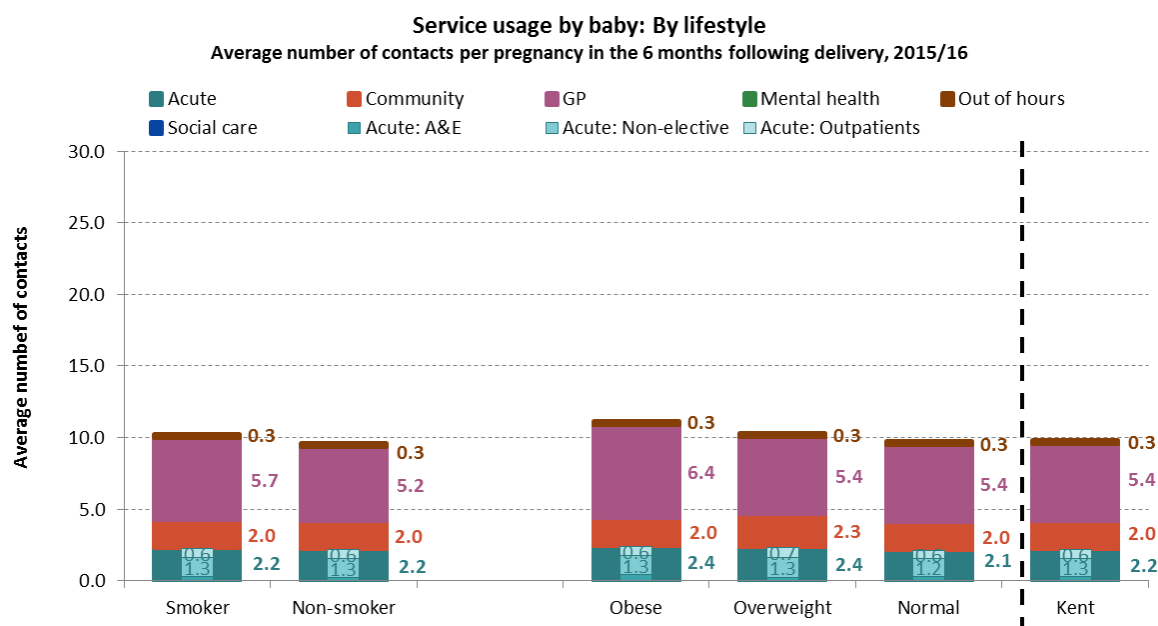
Source: Kent Integrated Dataset, prepared by KPHO (RK), January 2017

Analysis of the costs of wider health and social care service usage also demonstrate slightly higher costs per pregnancy for both mothers and babies where the mother smokes or is obese. It should be noted that these costs exclude both community midwife and outpatient activity.

Costs of service usage after pregnancy by mother and baby: By lifestyle
Average cost per pregnancy in the 6 months following delivery, 2015/16

Legend: Acute, Community, GP, Mental health, Out of hours, Social care, Acute: A&E, Acute: Non-elective, Acute: Outpatients

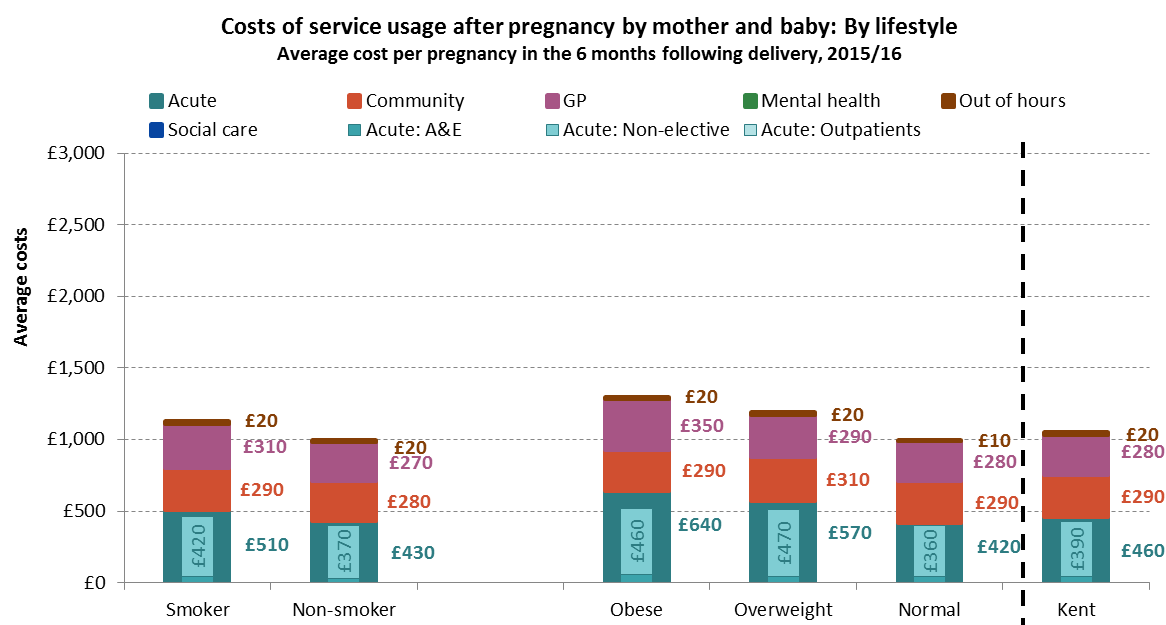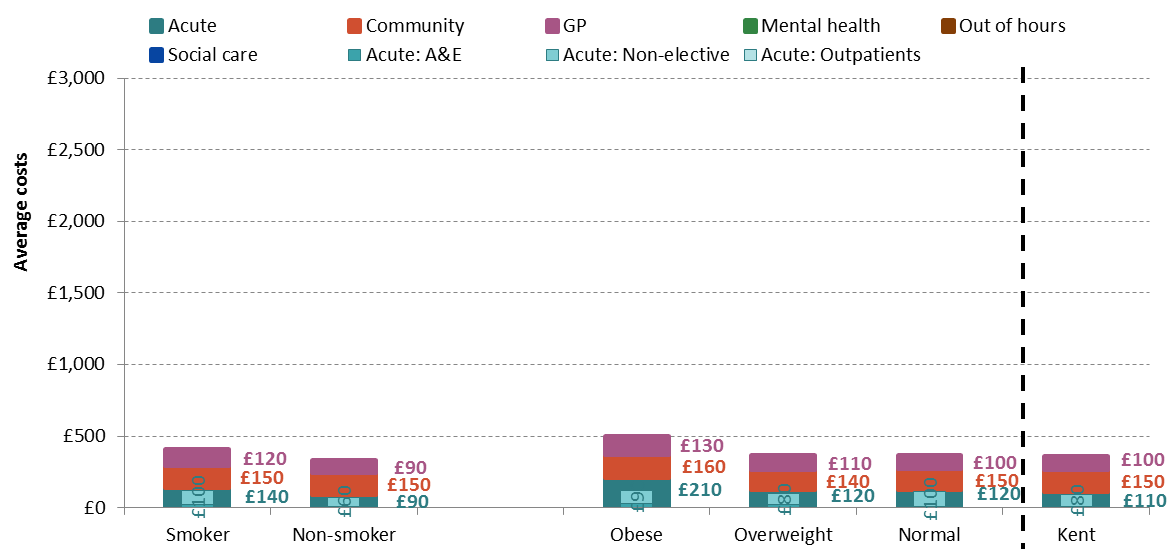| Category	Out of hours	GP	Community	Acute	(inner Acute)
Smoker	£20	£310	£290	£510	£420
Non-smoker	£20	£270	£280	£430	£370
Obese	£20	£350	£290	£640	£460
Overweight	£20	£290	£310	£570	£470
Normal	£10	£280	£290	£420	£360
Kent	£20	£280	£290	£460	£390

Source: Kent Integrated Dataset, prepared by KPHO (RK), January 2017

Maternity needs assessment, March 2017

Costs of service usage by mother after pregnancy: By lifestyle
Average cost per pregnancy in the 6 months following delivery, 2015/16

■ Acute ■ Community ■ GP ■ Mental health ■ Out of hours
■ Social care ■ Acute: A&E ■ Acute: Non-elective ■ Acute: Outpatients

Average costs

Smoker — £120, £150, £140, £100
Non-smoker — £90, £150, £90, £60
Obese — £130, £160, £210, £90
Overweight — £110, £140, £120, £80
Normal — £100, £150, £120, £100
Kent — £100, £150, £110, £80

Source: Kent Integrated Dataset, prepared by KPHO (RK), January 2017

Costs of service usage by baby: By lifestyle
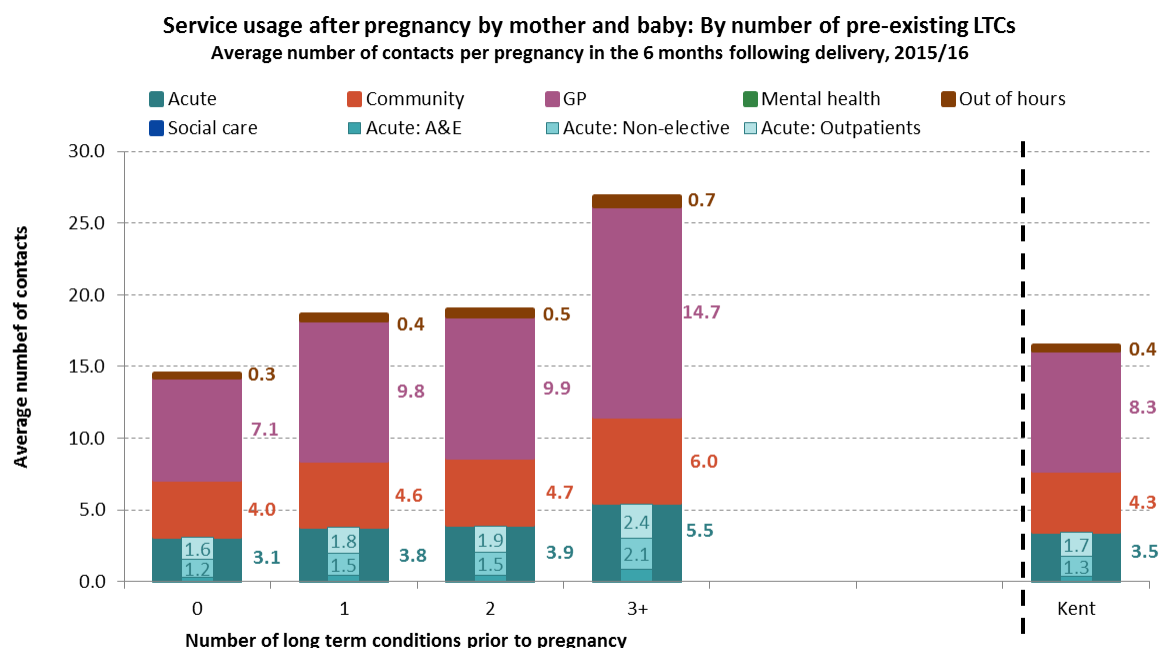### Average cost per pregnancy in the 6 months following delivery, 2015/16

■ Acute ■ Community ■ GP ■ Mental health ■ Out of hours
■ Social care ■ Acute: A&E ■ Acute: Non-elective ■ Acute: Outpatients

Average costs

Smoker — £10, £200, £140, £370, £330
Non-smoker — £10, £180, £140, £340, £300
Obese — £10, £220, £140, £420, £370
Overweight — £10, £180, £160, £450, £390
Normal — £10, £180, £140, £300, £260
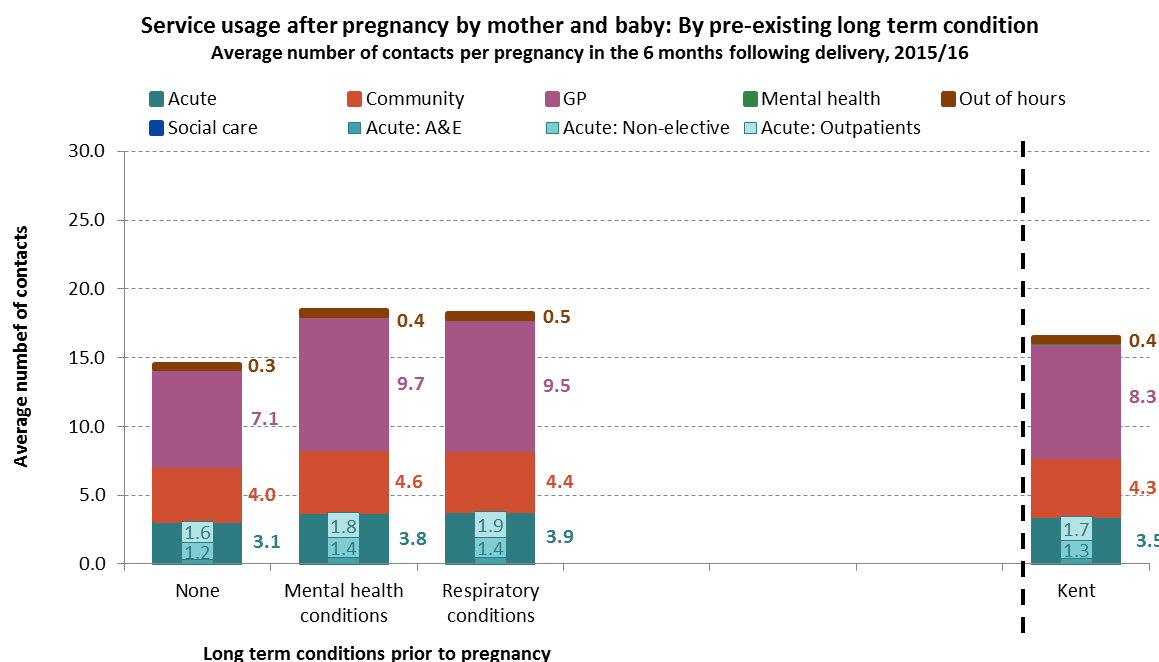Kent — £10, £180, £140, £350, £310

Source: Kent Integrated Dataset, prepared by KPHO (RK), January 2017

6.2.3 Service usage & costs after pregnancy: By long term conditions

Wider health and social care service usage increases for both mothers and babies as the number of pre-existing long term conditions in the mother increases. Service usage increased at a similar rate for those with pre-existing mental health conditions as those with pre-existing respiratory conditions.
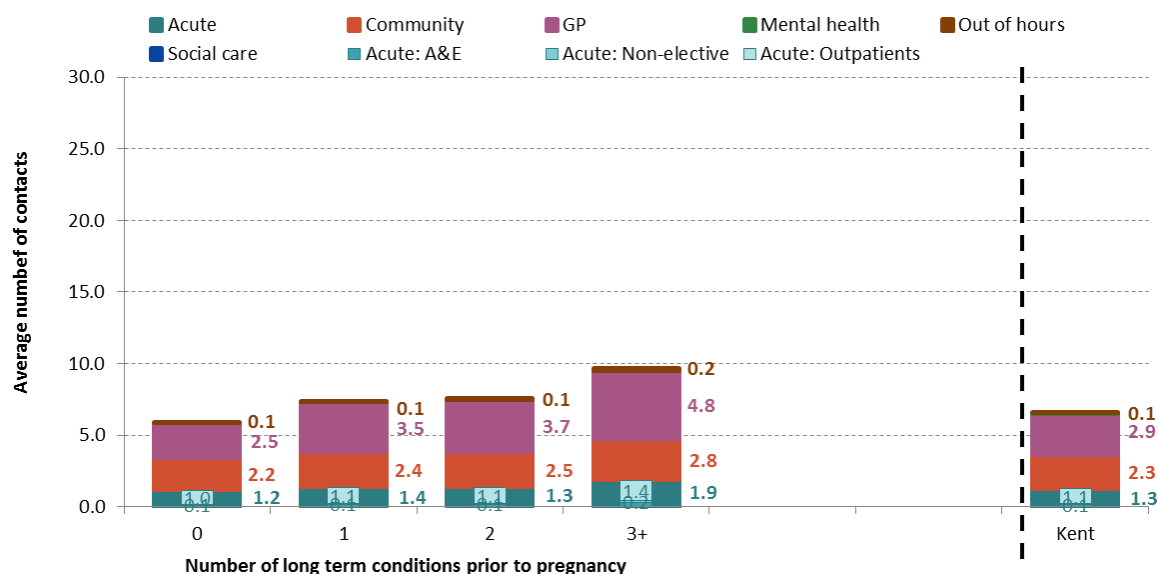
Service usage after pregnancy by mother and baby: By number of pre-existing LTCs
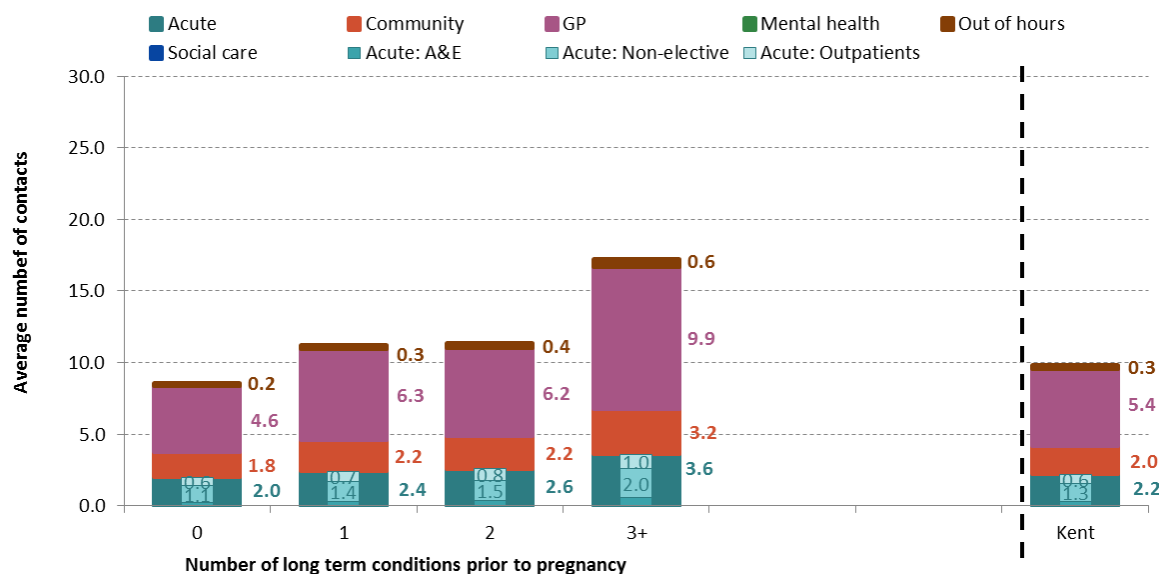**Average number of contacts per pregnancy in the 6 months following delivery, 2015/16**

Source: Kent Integrated Dataset, prepared by KPHO (RK), January 2017

Service usage after pregnancy by mother and baby: By pre-existing long term condition
Average number of contacts per pregnancy in the 6 months following delivery, 2015/16

Source: Kent Integrated Dataset, prepared by KPHO (RK), January 2017

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Service usage by mother after pregnancy: By number of pre-existing long term conditions
Average number of contacts per pregnancy in the 6 months following delivery, 2015/16
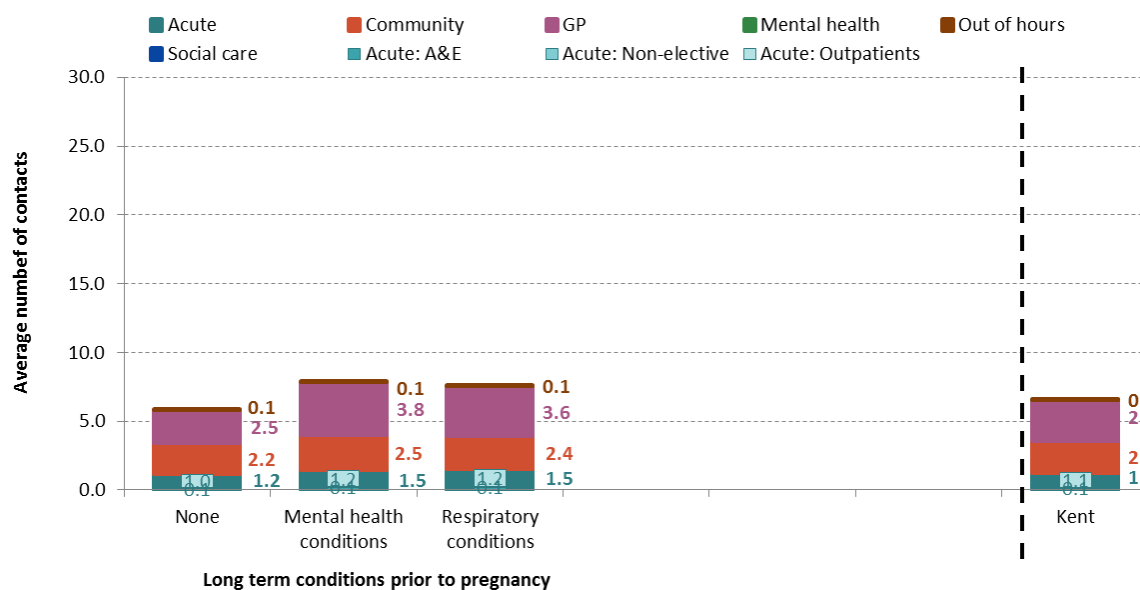
Legend: ■ Acute ■ Community ■ GP ■ Mental health ■ Out of hours
■ Social care ■ Acute: A&E ■ Acute: Non-elective ■ Acute: Outpatients

Y-axis: Average numbef of contacts (0.0 – 30.0)
X-axis: Number of long term conditions prior to pregnancy

Data labels:
- 0: 1.0, 1.2, 2.2, 2.5, 0.1
- 1: 1.1, 1.4, 2.4, 3.5, 0.1
- 2: 1.1, 1.3, 2.5, 3.7, 0.1
- 3+: 1.4, 1.9, 2.8, 4.8, 0.2
- Kent: 1.1, 1.3, 2.3, 2.9, 0.1

Source: Kent Integrated Dataset, prepared by KPHO (RK), January 2017

Service usage by baby: By number of pre-existing long term conditions
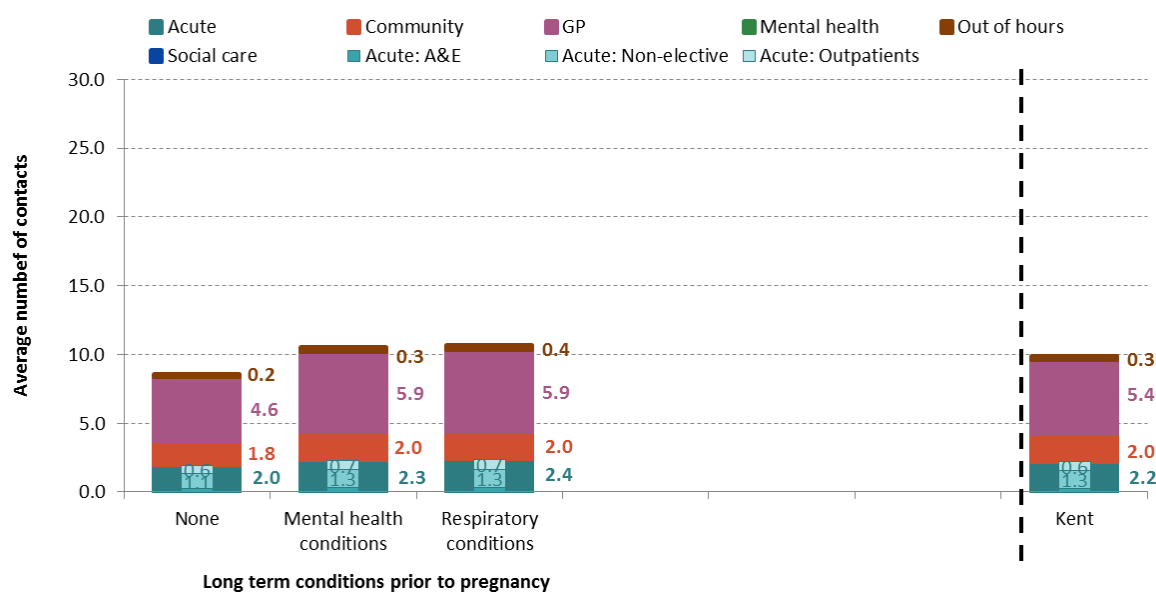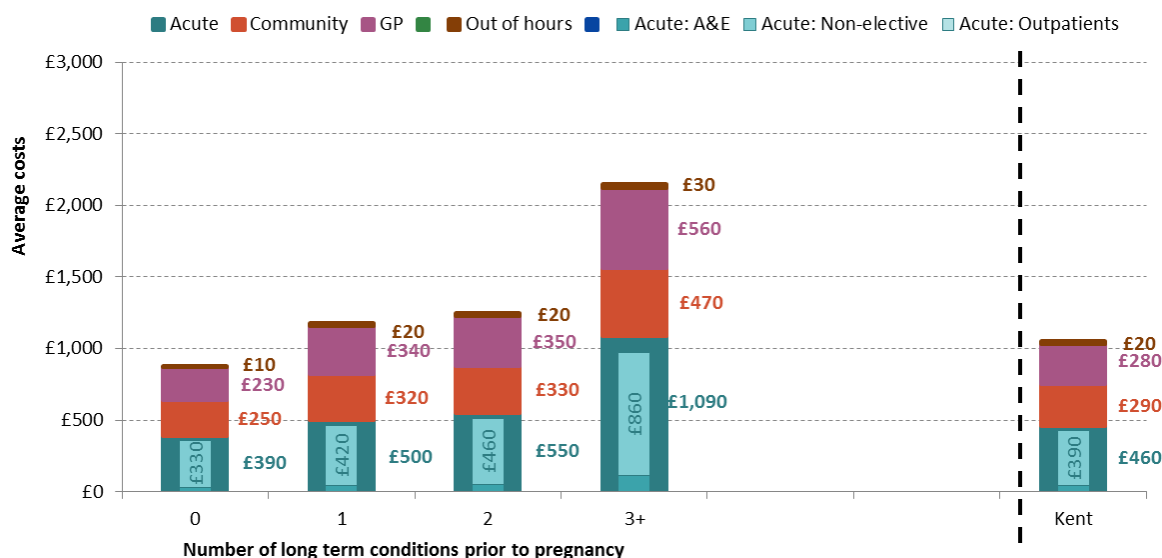### Average number of contacts per pregnancy in the 6 months following delivery, 2015/16

Legend: ■ Acute ■ Community ■ GP ■ Mental health ■ Out of hours
■ Social care ■ Acute: A&E ■ Acute: Non-elective ■ Acute: Outpatients

Y-axis: Average numbef of contacts (0.0 – 30.0)
X-axis: Number of long term conditions prior to pregnancy

Data labels:
- 0: 0.6, 1.1, 2.0, 1.8, 4.6, 0.2
- 1: 0.7, 1.4, 2.4, 2.2, 6.3, 0.3
- 2: 0.8, 1.5, 2.6, 2.2, 6.2, 0.4
- 3+: 1.0, 2.0, 3.6, 3.2, 9.9, 0.6
- Kent: 0.6, 1.3, 2.2, 2.0, 5.4, 0.3

Source: Kent Integrated Dataset, prepared by KPHO (RK), January 2017

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Service usage by mother after pregnancy: By pre-existing long term condition
Average number of contacts per pregnancy in the 6 months following delivery, 2015/16

Legend:
- Acute
- Community
- GP
- Mental health
- Out of hours
- Social care
- Acute: A&E
- Acute: Non-elective
- Acute: Outpatients

Average number of contacts (y-axis, 0.0 to 30.0)

None:
- 0.1
- 1.0
- 1.2
- 2.2
- 2.5
- 0.1

Mental health conditions:
- 0.1
- 1.2
- 1.5
- 2.5
- 3.8
- 0.1

Respiratory conditions:
- 0.1
- 1.2
- 1.5
- 2.4
- 3.6
- 0.1

Kent:
- 0.1
- 1.1
- 1.3
- 2.3
- 2.9
- 0.1

Long term conditions prior to pregnancy (x-axis)

Source: Kent Integrated Dataset, prepared by KPHO (RK), January 2017

Service usage by baby: By pre-existing long term condition
Average number of contacts per pregnancy in the 6 months following delivery, 2015/16

Legend:
- Acute
- Community
- GP
- Mental health
- Out of hours
- Social care
- Acute: A&E
- Acute: Non-elective
- Acute: Outpatients

Average number of contacts (y-axis, 0.0 to 30.0)

None:
- 1.1
- 0.6
- 2.0
- 1.8
- 4.6
- 0.2

Mental health conditions:
- 1.3
- 0.7
- 2.3
- 2.0
- 5.9
- 0.3

Respiratory conditions:
- 1.3
- 0.7
- 2.4
- 2.0
- 5.9
- 0.4

Kent:
- 1.3
- 0.6
- 2.2
- 2.0
- 5.4
- 0.3

Long term conditions prior to pregnancy (x-axis)

Source: Kent Integrated Dataset, prepared by KPHO (RK), January 2017

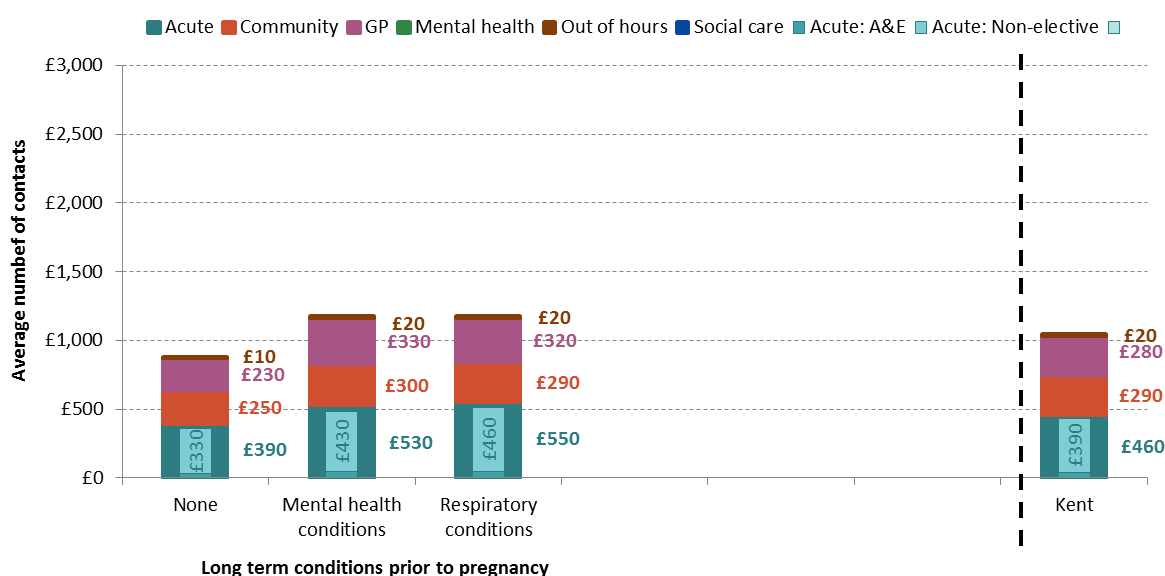Maternity needs assessment, March 2017

Analysis of the costs of wider health and social care service usage also demonstrate higher costs per pregnancy for both mothers and babies for mothers with more long term conditions, with the cost increase similar for those with pre-existing mental health conditions as those with pre-existing respiratory conditions. It should be noted that these costs exclude both community midwife and outpatient activity.

Costs of service usage after pregnancy by mother and baby: By number of pre-existing LTCs
Average cost per pregnancy in the 6 months following delivery, 2015/16

Legend: Acute ■ Community ■ GP ■ Out of hours ■ Acute: A&E ■ Acute: Non-elective ■ Acute: Outpatients

Source: Kent Integrated Dataset, prepared by KPHO (RK), January 2017

Cost of service usage after pregnancy by mother and baby: By pre-existing LTC
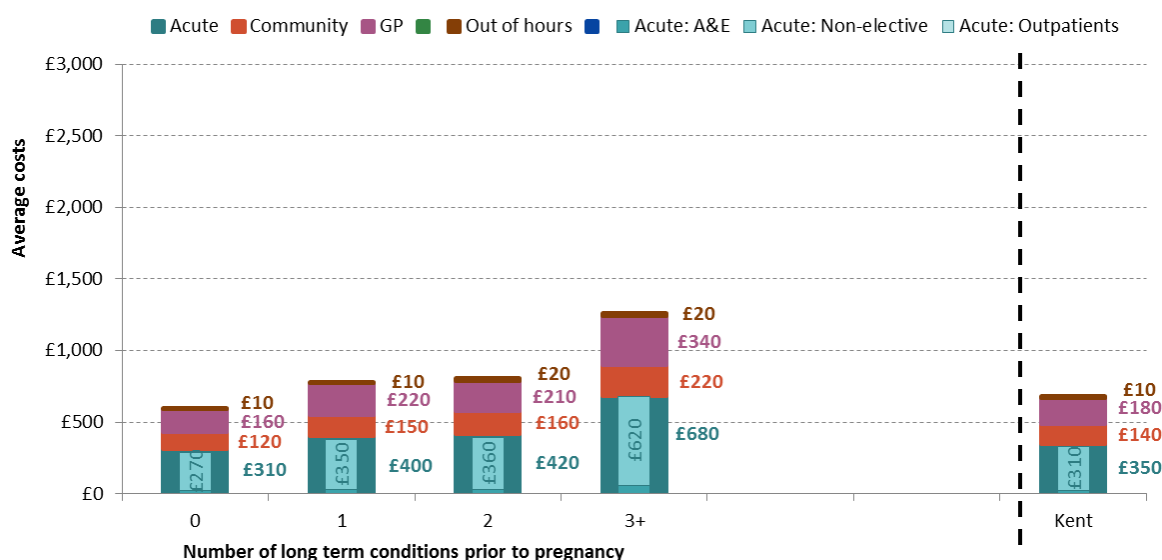Average cost per pregnancy in the 6 months following delivery, 2015/16

Legend: Acute ■ Community ■ GP ■ Mental health ■ Out of hours ■ Social care ■ Acute: A&E ■ Acute: Non-elective ■

Source: Kent Integrated Dataset, prepared by KPHO (RK), January 2017

Maternity needs assessment, March 2017

Costs of service usage by mother after pregnancy: By number of pre-existing LTCs
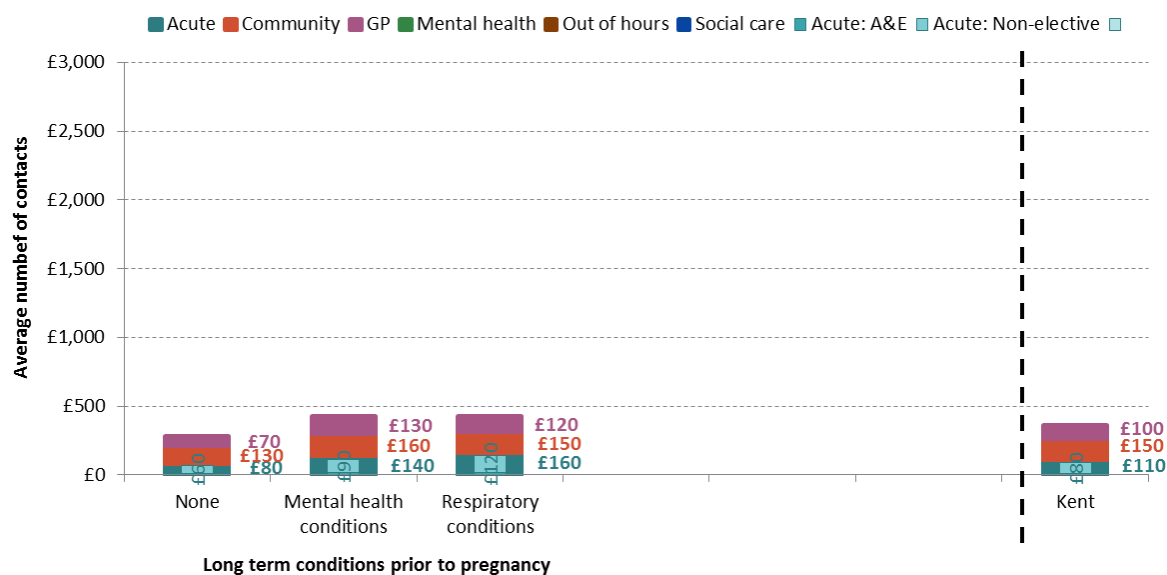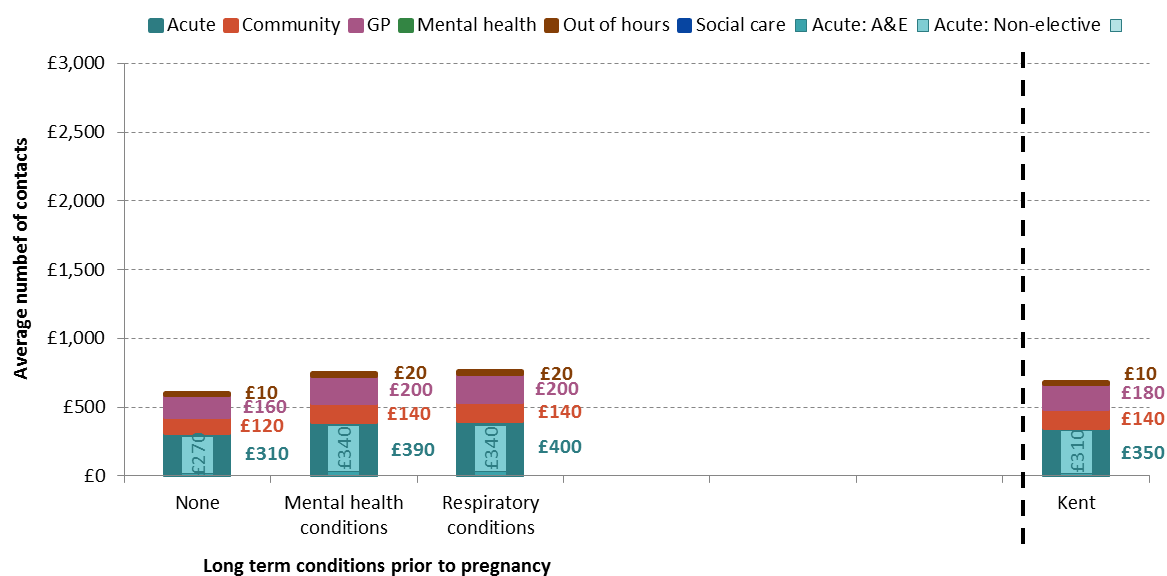### Average cost per pregnancy in the 6 months following delivery, 2015/16

Legend: ■ Acute ■ Community ■ GP ■ Out of hours ■ Acute: A&E ■ Acute: Non-elective ■ Acute: Outpatients

Y-axis: Average costs (£0 to £3,000)

X-axis: Number of long term conditions prior to pregnancy (0, 1, 2, 3+, Kent)

Data labels:
- 0: £60, £70, £130, £80
- 1: £70, £130, £170, £110
- 2: £100, £140, £180, £130
- 3+: £10, £230, £260, £400, £240
- Kent: £100, £150, £110, £80

Source: Kent Integrated Dataset, prepared by KPHO (RK), January 2017

Costs of service usage by baby: By number of pre-existing long term conditions
Average cost per pregnancy in the 6 months following delivery, 2015/16

Legend: ■ Acute ■ Community ■ GP ■ Out of hours ■ Acute: A&E ■ Acute: Non-elective ■ Acute: Outpatients

Y-axis: Average costs (£0 to £3,000)

X-axis: Number of long term conditions prior to pregnancy (0, 1, 2, 3+, Kent)

Data labels:
- 0: £10, £160, £120, £270, £310
- 1: £10, £220, £150, £350, £400
- 2: £20, £210, £160, £360, £420
- 3+: £20, £340, £220, £620, £680
- Kent: £10, £180, £140, £310, £350

Source: Kent Integrated Dataset, prepared by KPHO (RK), January 2017

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Cost of service usage by mother after pregnancy: By pre-existing long term condition
Average cost per pregnancy in the 6 months following delivery, 2015/16

Acute   Community   GP   Mental health   Out of hours   Social care   Acute: A&E   Acute: Non-elective

Average numbef of contacts

Long term conditions prior to pregnancy

None: £60, £70, £130, £80
Mental health conditions: £90, £130, £160, £140
Respiratory conditions: £120, £120, £150, £160
Kent: £80, £100, £150, £110

Source: Kent Integrated Dataset, prepared by KPHO (RK), January 2017

Cost of service usage by baby: By pre-existing long term condition
Average cost per pregnancy in the 6 months following delivery, 2015/16

Acute   Community   GP   Mental health   Out of hours   Social care   Acute: A&E   Acute: Non-elective

Average numbef of contacts

Long term conditions prior to pregnancy

None: £270, £310, £120, £160, £10
Mental health conditions: £340, £390, £140, £200, £20
Respiratory conditions: £340, £400, £140, £200, £20
Kent: £310, £350, £140, £180, £10

Source: Kent Integrated Dataset, prepared by KPHO (RK), January 2017

6.2.4 Conclusions

This analysis demonstrates that smoking and obesity (as well as long term conditions) are associated with increased service use during pregnancy, but also in the six months following delivery for both mother and baby. In many cases this is associated with increased costs. In view of the fact that the costs of outpatient appointments were not included, the true differences between groups in terms of cost are likely to be higher.

| 7. Peer comparisons

NHS RightCare (2016) has developed commissioning for value focus packs for CCGs which focus on maternity and the early years. These compare CCGs with the 10 CCGs most demographically similar to them in order to identify realistic opportunities to improve the health of the local population. The table shows those areas within maternity where Kent CCGs are performing better or worse than their peers. It also illustrates the potential opportunities for women and babies if CCGs improved their performance to match the average of their five best performing peers. Breastfeeding at 6-8 weeks has been included here, even though women are unlikely to still be under the care of maternity services at this point. This is because maternity services have an important role to play in helping women establish successful breastfeeding, thus making it more likely they will still be breastfeeding at 6-8 weeks.

Table 53: NHS RightCare peer comparisons

CCG	Areas CCG is performing statistically significantly better than 10 most similar peers	Areas CCG is performing statistically significantly worse than 10 most similar peers	Areas CCG is performing statistically significantly worse than average of best five within peer group	Extent of opportunity (against average of five best performing peers)
Ashford	Smoking at time of delivery	Flu vaccine take up by pregnant women	Under 18 conception rate	35 births
			Flu vaccine take up by pregnant women	95 women
		Breastfeeding at 6-8 weeks		
			Breastfeeding initiation (first	91 babies

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			48 hours	
			Breastfeeding at 6-8 weeks	227 babies
Canterbury and Coastal	Smoking at time of delivery	Flu vaccine take up by pregnant women	Under 18 conception rate	41 births
	Breastfeeding initiation (first 48 hours)	Breastfeeding at 6-8 weeks	Flu vaccine take up by pregnant women	174 women
			Breastfeeding initiation (first 48 hours	64 babies
			Breastfeeding at 6-8 weeks	182 babies
Dartford, Gravesham and Swanley		Flu vaccine take up by pregnant women	Under 18 conception rate	78 births
		Smoking at time of delivery	Flu vaccine take up by pregnant women	521 women
		Breastfeeding initiation (first 48 hours)	Smoking at time of delivery	116 women
		Breastfeeding at 6-8 weeks	Breastfeeding initiation (first 48 hours	480 babies
			Breastfeeding at 6-8 weeks	456 babies
South Kent Coast		Flu vaccine take up by pregnant	Flu vaccine take up by pregnant	263 women

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		women	women	
		Breastfeeding at 6-8 weeks	Smoking at time of delivery	59 women
			Breastfeeding initiation (first 48 hours	66 babies
			Breastfeeding at 6-8 weeks	
				306 babies
Swale	Under 18 conception rate	Smoking at time of delivery	Flu vaccine take up by pregnant women	93 women
		Breastfeeding initiation (first 48 hours)	Smoking at time of delivery	103 women
		Breastfeeding at 6-8 weeks	Breastfeeding initiation (first 48 hours	116 babies
			Breastfeeding at 6-8 weeks	
				143 babies
Thanet	Under 18 conception rate	Flu vaccine take up by pregnant women	Flu vaccine take up by pregnant women	224 women
	Breastfeeding initiation (first 48 hours)	Breastfeeding at 6-8 weeks	Breastfeeding at 6-8 weeks	180 babies
West Kent	Breastfeeding initiation (first 48 hours)	Under 18 conception rate	Under 18 conception rate	174 births
		Flu vaccine take up by pregnant	Flu vaccine take up by pregnant	706 women

		women	women	
		Breastfeeding at 6-8 weeks	Smoking at time of delivery	103 women
			Breastfeeding at 6-8 weeks	
				354 babies

Source: NHS RightCare

This table shows there are a number of areas where Kent CCGs are consistently performing worse than their peers. In particular all are performing worse on breastfeeding at 6-8 weeks, and six of the seven CCGs are performing worse than their peers on uptake of flu vaccination by pregnant women. If CCGs were able to improve their performance to that of the average of their five best performing peers, in total, across Kent each year, this would mean:

• 328 fewer births to 15-17 year olds

• An additional 2,076 women receiving flu vaccine

• 381 fewer women smoking at time of delivery

• 1,164 more babies initiating breastfeeding

• 1,848 more babies breastfeeding at 6-8 weeks

This table also illustrates the importance of comparison against peer CCGs, rather than just looking at absolute rates when considering the potential for gains. For example Swale and West Kent CCGs have the same potential opportunity in terms of smoking at time of delivery in spite of very different actual rates.

7.1 Immunisation in pregnancy

Influenza vaccine uptake in pregnant women during the 2015/16 influenza season was 40.5% in Kent and Medway, compared with 42.3% in England. This varied from 35.9% in Dartford, Gravesham and Swanley CCG to 43.1% in Canterbury and Coastal CCG as shown in the figure below.

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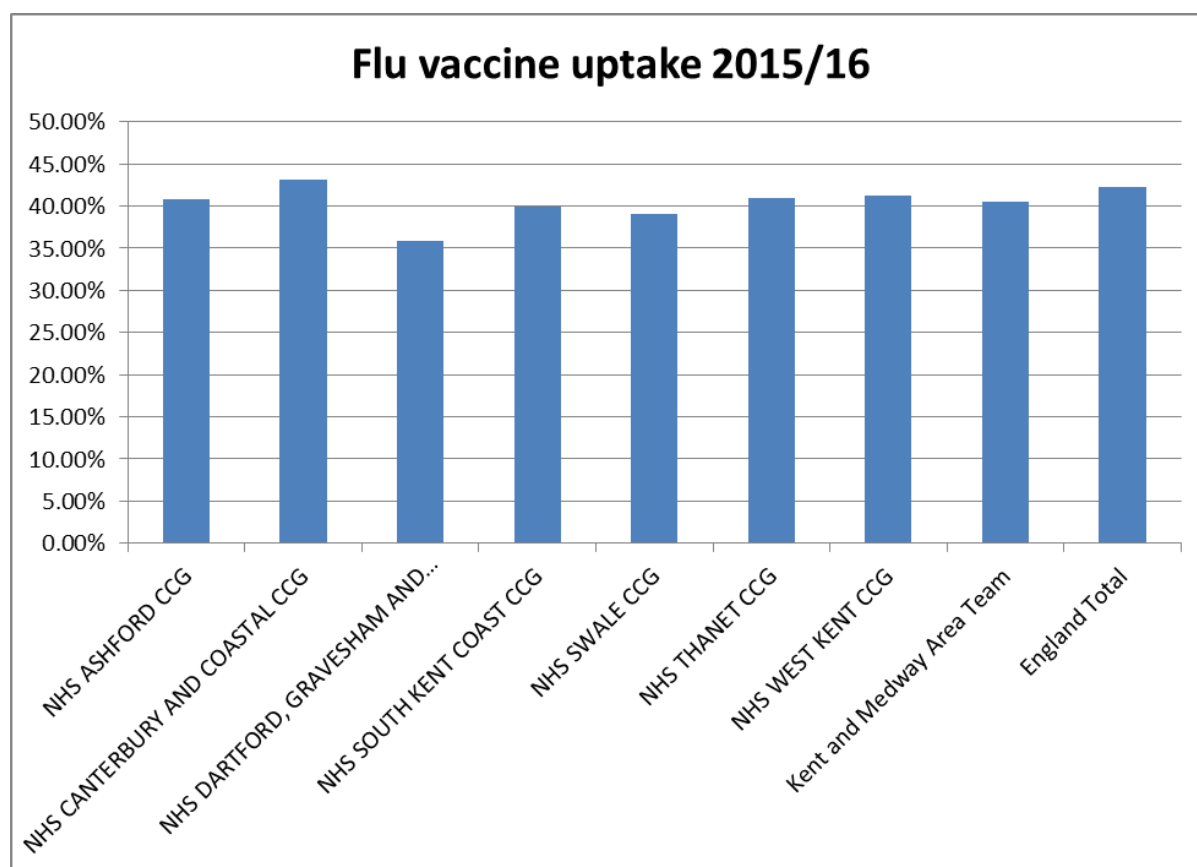
Source: Public Health England

It is likely that flu vaccine uptake for pregnant women is underestimated, because accurately identifying the denominator is challenging. This is because it includes all women who are already pregnant or who become pregnant (as diagnosed by a medical professional) from the start of the flu season on 1st September. Some women may therefore be included in the denominator who become ineligible before they are vaccinated (for example because they miscarry or give birth).

Pertussis vaccination uptake in pregnant women is reported on a monthly basis. Between April 2015 and December 2016 uptake in Kent and Medway varied from 56.5% in June 2015 to 73.7% in July 2017 (Public Health England, 2016). Over the same period uptake in England varied from 55.1% in June 2015 to 71.4% in September 2016. There is considerable monthly variation in the uptake rate as shown in the figure.

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Pertussis vaccine uptake in pregnant women, April 15-Sept 16
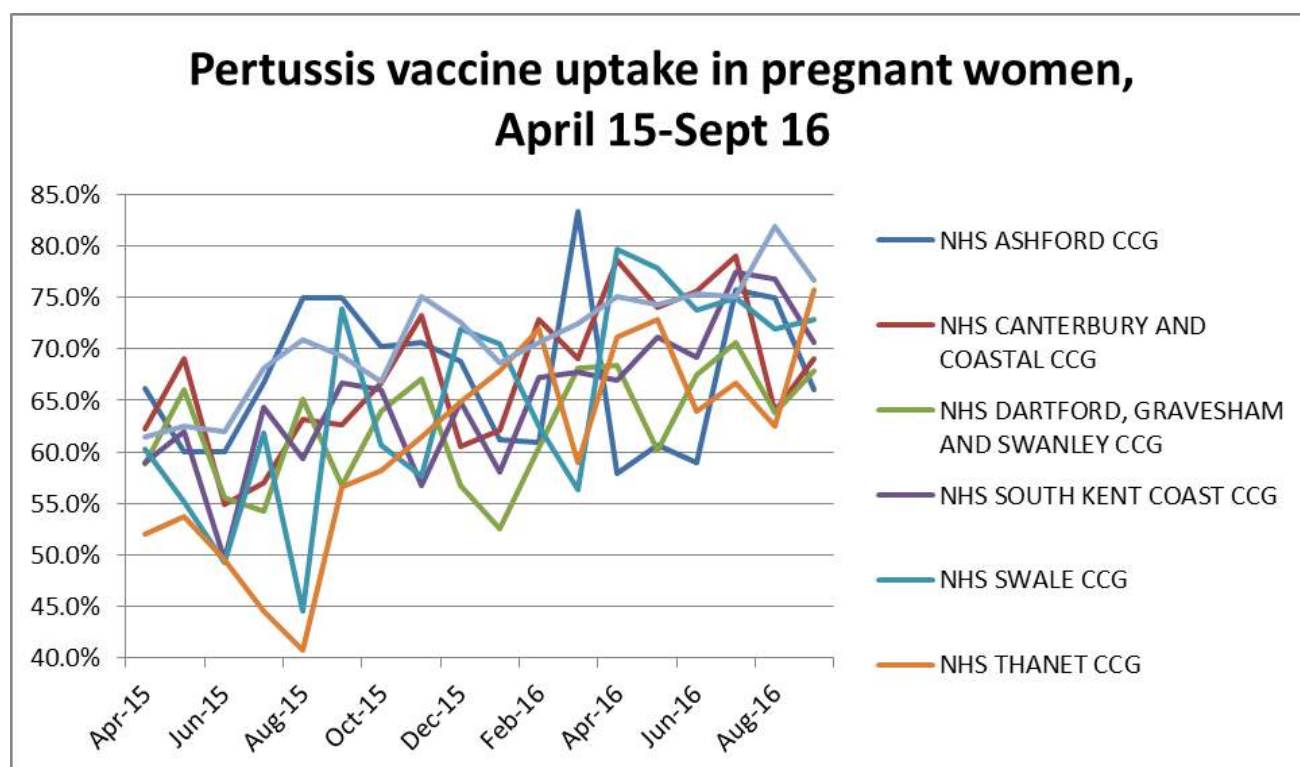
Source: Public Health England

There have been a considerable number of studies looking at the factors associated with the uptake or non-uptake of flu vaccine in pregnancy, for both seasonal and pandemic flu vaccination. Findings are generally consistent across a range of different countries and health care systems and are summarised in the table below.

Table 14: Factors associated with acceptance or refusal of flu vaccine

Factors associated with accepting vaccine	Factors associated with non-uptake or refusal of vaccine
• Receiving advice/recommendation to be vaccinated. (Laenen et al, 2015; Yuen et al, 2014; Bödeker et al, 2014; Drees et al, 2013; Maher et al, 2013; Gorman et al, 2012; Ahluwalia et al, 2010) • Greater knowledge about both vaccine and infection. (Yuen et al, 2014; Bödeker et al, 2014; Eppes et al, 2013; Tarrant et al, 2013) • Belief that the vaccine is both safe	• Lack of advice/recommendation from provider (Laenen et al, 2015; Maher et al, 2013; Yuen et al, 2013; Ahluwalia et al, 2010 • Concerns about vaccine safety. (Laenen et al, 2015; Yuen et al, 2014; Maher et al, 2013; Drees et al, 2013; CDC, 2011) • Concerns about vaccine effectiveness. (CDC, 2013; CDC, 2011)

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and effective.

(Eppes et al, 2013; Yuen et al 2013; Gormal et al; 2012)

- Perception of flu as severe/ fear of flu during pregnancy/ perceived susceptibility to flu.

(Bödeker et al, 2014; Yuen et al, 2014; Henninger et al, 2013; Maher et al, 2013; Yuen et al, 2013; Gorman et al, 2012)

- Previous receipt of flu vaccination

(Bödeker et al, 2014; Drees et al, 2013; Yuen et al, 2013; Freund et al, 2011)

- Concern to protect both infant and mother

(Ding et al, 2014; Maher et al, 2013; Meharry et al, 2013)

- Higher level of income or education

(Laenen et al, 2015; Yuen et al, 2014; Freund et al, 2011)

- Older women

(van Lier et al, 2012; CDC, 2011)

- Women with underlying medical conditions

(Yuen et al, 2014; van Lier et al, 2012)

- Women who had been pregnant before

(van Lier et al, 2012)

- Ethnicity (varies by country but groups found to have higher vaccination rates include European and white groups)

(Yuen et al, 2014; Freund et al, 2011)

- Non-smokers

(Yuen et al, 2014)

- Trust of guidelines recommending

- Fear the vaccine causes flu

(Ding et al, 2014; Henninger et al, 2013)

- Fear of side effects

(Bödeker et al, 2014; Henninger et al, 2013; Tarrant et al, 2013; Ahluwalia et al, 2010)

- Belief that vaccination not necessary

(Bödeker et al, 2014; Ding et al, 2014)

- Not perceiving themselves to be at risk of flu.

(Drees et al, 2013; Henninger et al, 2013)

- Younger, less educated, poor women.

(Ding et al, 2014; CDC, 2013)

- Ethnicity (varies by country but groups found to have lower vaccination rates include African, Asian and black groups)

(CDC, 2013; Freund et al, 2011)

- Provider seems indifferent to vaccination or presents pros and cons.

(Meharry et al, 2013)

- Belief that flu is not severe.

(CDC, 2013; CDC 2011)

- Not usually getting flu vaccine.

(Drees et al, 2013)

vaccination. (Henninger et al, 2013)	

Receiving a recommendation from a healthcare provider is consistently found to be one of the most important, if not the most important, factor determining whether women are vaccinated. Those who received both a recommendation and an offer of vaccination from their physician are the group most likely to be vaccinated, and this remains true even for those with negative attitudes to the vaccine or concerns about vaccine safety (Ding et al, 2014). Although this is the case, many pregnant women report that they did not receive a recommendation to be vaccinated and in some cases this was even discouraged by their healthcare provider (Yuen et al, 2014).

An online survey of London midwives (Ishola et al, 2011) found that only 69% believed that offering all pregnant women seasonal flu vaccine was justified, 19% were unsure and 12% disagreed. Although 76% felt that midwives should have a routine role in giving flu vaccine information and advice to pregnant women, only 26% felt well prepared to perform this role. Only 35% felt midwives should routinely undertake vaccination themselves. Although this may not be directly applicable to pertussis vaccination it does suggest that a considerable number of midwives may have concerns about offering vaccination in pregnancy and do not feel adequately prepared to do so. This is likely to impact on the quality of the advice given to women.

The findings on flu vaccination are also consistent with the evidence that is emerging on factors associated with pertussis vaccine uptake in pregnancy.

A cross sectional survey of 200 pregnant women (at least 27 weeks pregnant) accessing antenatal care at Imperial Healthcare NHS Trust (Donaldson et al, 2015) on pertussis vaccination in pregnancy found that uptake was highest in white women and lowest in black/black British women. The main reason given by women for accepting vaccination was recommendation by a healthcare professional. Other reasons included protection for themselves and their baby and preventing pertussis and any damage caused to their baby by it. Women's knowledge and understanding of the vaccine was found to be limited. Knowing someone who had had pertussis or having personal experience of vaccine preventable disease also influenced women's decision to accept vaccination. Women with complicated pregnancies were more likely to have been vaccinated. The main reason cited for not taking up vaccination was not being aware or informed of the vaccine (51.3% of non-vaccinated women), followed by having insufficient information about the vaccine (32.6%). Safety concerns were expressed by 12.6%. The majority of all women (91%) believed their healthcare professional should provide them with more information on the recommended vaccines in pregnancy, in a timely manner with a meaningful discussion. Other sources of information included discussions with friends and relatives, printed material, radio and the internet. A considerable proportion of women (37%) were not aware of the vaccination

programme. Only 34% of women had been offered vaccination at their GP practice. The main sources of information about the vaccination programme were the GP (24%), midwife (13%) and antenatal clinic (10%). The preferred routes for information about vaccination programmes were the antenatal clinic (60%), GP (59%) and midwife (35%). Other suggestions included a letter (22%), website (20.5%), leaflet or poster (19.0%) and text or email (15%).

An online survey of UK women was carried out in January 2013 (Campbell et al, 2015), soon after the introduction of the pertussis vaccination programme. It had a broader focus on attitudes to immunisation in pregnancy, although there were some specific questions on pertussis vaccine. Just over two thirds (69.7%) of women felt that they had all the information they required to make the decision about whether to receive vaccination. The most common reason for women choosing not to be vaccinated was vaccine safety concerns. Other reasons included believing that they or their baby did not require protection from whooping cough or that they could protect their baby through other means. Others did not want to be immunised in pregnancy or did not believe in vaccination. In general when considering whether to receive a vaccination in pregnancy factors identified by women as important were safety of the vaccine for the baby and themselves, vaccine effectiveness, seriousness of the disease, GP or midwife recommendation and the views of their partner. In this study television was cited as a source of information on the pertussis vaccination programme for the biggest group of women (46.8%), perhaps owing to the fact that the study took place shortly after the vaccination programme was introduced. Other sources of information included midwife (35.2%), friends or family (18.4%), GP (18.1%), NHS poster or leaflet (17%) and newspaper or magazine (17%). Midwives (90.1%) and GPs (70.6%) were identified as the preferred sources of information about vaccination in pregnancy. White British respondents were more positive about vaccination than those from other ethnic groups.

Studies from the US show similar results. Analysis of uptake data found that pertussis vaccination rates are higher in white women, older women and in mothers of infants born at full term (Housey et al, 2014). Recommendation from a healthcare provider was again identified as an important factor, with 93% of women willing to be immunised during pregnancy if recommended by their healthcare provider (Beel et al, 2013). Women were more likely to be vaccinated against pertussis if they had also received flu vaccine in the pregnancy under consideration. Black women and those who delivered pre-term were less likely to have received it (Goldfarb et al, 2014).

7.2   Infant feeding

Breastfeeding initiation in Kent in 2014/15 was 71.3% (Public Health England, 2016). This was significantly lower than England (74.3%). It varied considerably across Kent, from 63.8% in Swale to 84.7% in Tunbridge Wells, however data from three districts (Dover, Gravesham and Sevenoaks) was unavailable for quality reasons. No data was available from Public

Health England on breastfeeding prevalence within Kent at 6-8 weeks for reasons of data quality (incompleteness of source data).

NICE have developed guidance on maternal and child nutrition (NICE, 2014), which includes guidance aimed at improving rates of breastfeeding. Recommendations include:

- Adopt a multifaceted approach or a coordinated programme of interventions across different settings to increase breastfeeding rates. It should include:

    o activities to raise awareness of the benefits of – and how to overcome the barriers to – breastfeeding

    o training for health professionals

    o breastfeeding peer-support programmes

    o joint working between health professionals and peer supporters

    o education and information for pregnant women on how to breastfeed, followed by proactive support during the postnatal period (the support may be provided by a volunteer).

- Implement a structured programme that encourages breastfeeding, using Baby Friendly Initiative (BFI) as a minimum standard. The programme should be subject to external evaluation. Although Kent services are working towards this standard, so far none have reached it.

- Ensure all those who work in maternity and children's services, including receptionists, volunteers and ancillary staff, are made fully aware of the importance of breastfeeding and help to promote a supportive environment.

- Midwives and health visitors should ensure pregnant women and their partners are offered breastfeeding information, education and support on an individual or group basis. This should be provided by someone trained in breastfeeding management and should be delivered in a setting and style that best meets the woman's needs.

- A midwife or health visitor trained in breastfeeding management should provide an informal group session in the last trimester of pregnancy. This should focus on how to breastfeed effectively by covering feeding position and how to attach the baby correctly.

- Ensure a mother can demonstrate how to position and attach the baby to the breast and can identify signs that the baby is feeding well. This should be achieved (and be documented) before she leaves hospital or the birth centre (or before the midwife leaves the mother after a home birth).

- Commissioners and managers should ensure mothers have access to independent advice from a qualified health professional on the use of infant formula. This should

include information on the potential risks associated with formula feeding and how to obtain ongoing advice at home.

- Midwives should ensure mothers who choose to use infant formula are shown how to make up a feed before leaving hospital or the birth centre (or before the mother is left after a home birth). This advice should follow the most recent guidance from the Department of Health.

Relevant recommendations from NICE are also found in their guidance on postnatal care up to 8 weeks after birth (NICE, 2015). This provides comprehensive and detailed recommendations on supporting women to successfully initiate and continue breastfeeding, assessing successful breastfeeding, and preventing, identifying and treating some common breastfeeding problems for example tongue tie. It also recommends that all parents and carers who are giving their babies formula feed should be offered appropriate and tailored advice on formula feeding to ensure this is undertaken as safely as possible, in order to enhance infant development and health, and fulfil nutritional needs. The recommendations also include a focus on the first hour after birth, for example recommending that:

- Initiation of breastfeeding should be encouraged as soon as possible after the birth, ideally within 1 hour.

- From the first feed, women should be offered skilled breastfeeding support (from a healthcare professional, mother‑to‑mother or peer support) to enable comfortable positioning of the mother and baby and to ensure that the baby attaches correctly to the breast to establish effective feeding and prevent concerns such as sore nipples.

- Women should be encouraged to have skin‑to‑skin contact with their babies as soon as possible after the birth.

- Separation of a woman and her baby within the first hour of the birth for routine postnatal procedures, for example weighing, measuring and bathing, should be avoided unless these measurements are requested by the woman, or are necessary for the immediate care of the baby.

The World Breastfeeding Trends Initiative (WBTi) is a collaborative national assessment of the implementation of key policies and programmes from the WHO's Global Strategy for Infant and Young Child Feeding. It brings together the main agencies and organisations involved in aspects of infant and young child feeding in a particular country to work together to collect information, identify gaps and generate recommendations for action. In 2016 a WBTi assessment for the UK was published (WBTi, 2016)

The report recommends that to protect the health and wellbeing of mothers, babies, society and the environment, all families need enabling policies and access to skilled support at every step of their breastfeeding journey. Interventions must underpin the whole breastfeeding experience, including:

- birth in a supportive Baby Friendly-accredited maternity setting;

- access to skilled support in the community from HCPs, trained volunteers and mother support groups;

- a high standard of training and support through health and community services,

- strong protection of breastfeeding in the workplace and public life;

- robust regulation of the promotion of breastmilk substitutes;

- public awareness and support for breastfeeding throughout society;

- political will combined with strategy and coordination at the national level.

Many of the recommendations within this report apply at a national level and describe what actions the government should take, for example the recommendation that England should develop and ensure implementation of a national infant feeding strategy. However, some are directly applicable to local commissioners and providers, for example:

- Commissioners to ensure there is a range of integrated postnatal services that include both health professional and voluntary-sector breastfeeding support, meet local needs and provide clear access to specialist support.

- Train all healthcare staff and community workers on up-to-date World Health Organization and British HIV Association recommendations on HIV and infant feeding.

- Health Visitors to have up-to-date training on breastfeeding and developing close relationships between mothers and babies in order to deliver consistent, evidence-based support and information, free from commercial influence.

- Specific training on medications and their effect on breastfeeding for medical professionals, pharmacists and nurses, including accessing appropriate sources of information and guidance.

- Trusts and boards to require infant feeding leads to have an infant feeding qualification.

- Post-registration training through implementation of Baby Friendly standards across all relevant healthcare facilities to ensure minimum levels of in-service training in IYCF, including separate basic standards for paediatricians and GPs, with assessment and mentoring.

- Improved training for staff to support breastfeeding/continued lactation when either mothers or babies are hospitalised.

The review carried out by Buttivant in 2014 made some recommendations relevant to infant feeding. These were:

- Wherever practicable the paper-based information that is provided to parents across Kent on issues such as lifestyle, breastfeeding and preparation for parenthood should be standardised. All 3 maternity service providers should work together to review the contents of the leaflets currently provided antenatally and postnatally to identify the most appropriate sources of information.

- Midwives should ensure that contact details for local breastfeeding support groups are always provided antenatally.

- Heads of Midwifery should collaborate to identify opportunities to provide breastfeeding information for fathers and to encourage them to provide breastfeeding support to their partners. (Although this recommendation specifically related to fathers, the role of the wider family in supporting women in breastfeeding is important and therefore this recommendation should be widened to include this).

- Commissioners and Maternity Services across Kent should undertake a needs assessment for tongue tie services and explore cost-effective models for delivery (such as the midwifery led service in MTW) in order to ensure equitable access to tongue-tie services for infants across Kent.

7.3   Recommendations

- Providers should ensure staff are trained and confident to provide women with advice about vaccination in pregnancy and that vaccines are recommended to all pregnant women in line with the most up to date schedule.
- Providers and commissioners should work together to identify other potential opportunities to increase vaccine uptake in pregnant women, for example enabling pregnant women to receive vaccines during antenatal appointments where this would be feasible.
- Providers and commissioners to work together to ensure women are provided with support with infant feeding in line with recommendations made by NICE and WBTi, as well as addressing the specific local recommendations made by Buttivant (2014).
- Hospital and community services within Kent should aim to meet BFI standards as soon as possible.

| 8. Conclusion

This needs assessment has sought to focus on women's health in pregnancy, in particular considering smoking, obesity and long term conditions. Analysis shows that service use both during and after pregnancy, for women and their babies, is higher in women who smoke,

are obese or who have long term conditions. Although not all costs were able to be included in the analysis, cost of service use was in general also higher in these groups.

Research has shown that smokers and obese women, and their babies, are at increased risk of experiencing adverse outcomes. This analysis has confirmed that they are also more likely to suffer from one or more long term conditions, which may put them at further increased risk of adverse outcomes if they are not provided with the support they need during pregnancy and the postpartum period. Peer comparison demonstrates realistic scope for improving smoking in pregnancy rates across much of Kent. Evidence shows that interventions to help pregnant women stop smoking are both effective and cost effective, thus confirming the particular importance of focusing on this.

9. Recommendations

- That the LMS should review and prioritise the recommendations in this needs assessment, as well as those in the review of the relationship between Public Health and Maternity Services with respect to the delivery of the antenatal and postnatal elements of the Healthy Child Programme (Buttivant, 2014), and take responsibility for monitoring their implementation.
- That maternity commissioners take into account the projected population increases, particularly as a result of housing developments in some parts of Kent, to ensure maternity services are able to cope with the likely increased demand in the future.
- That maternity commissioners work with providers to improve the quality of data recording. Analysis of birth weight data suggests this may be a particular problem at MFT.
- Maternity commissioners and providers should work together to address the high numbers of Kent women smoking at time of delivery. In view of the importance of smoking as a cause of both maternal and infant complications and the significance given to this by NHS England in the reducing stillbirths care bundle (NHS England, 2016) as well as the availability of effective and cost effective interventions, this should be a priority area for action.
- Maternity providers should work with staff to increase the completeness of carbon monoxide monitoring by midwives at the booking appointment.
- Maternity providers should work with staff to ensure all those women identified as smokers or with a raised carbon monoxide reading at booking are referred to smoking cessation services.
- Maternity commissioners and providers to work together to identify the most suitable approaches to tackle the high number of women who the smoking cessation service is unable to make contact with.

- Commissioners and providers should work together to ensure that there is sufficient capacity to refer all women with a BMI >30 for dietetic support as per the NICE Guideline PH27

- As part of the process of expanding the perinatal mental health service, using the funding awarded from the perinatal mental health community services development fund, it is recommended that the recommendations from both the report by Buttivant and those from the perinatal mental health needs assessment are addressed.

- Providers should be alert to the increased risk of long term conditions and mental health problems in smokers and obese women and ensure these are appropriately managed during pregnancy and the postpartum period.

- Providers should ensure staff are trained and confident to provide women with advice about vaccination in pregnancy and that vaccines are recommended to all pregnant women in line with the most up to date schedule.

- Providers and commissioners should work together to identify other potential opportunities to increase vaccine uptake in pregnant women, for example enabling pregnant women to receive vaccines during antenatal appointments where this would be feasible.

- Providers and commissioners to work together to ensure women are provided with support with infant feeding in line with recommendations made by NICE and WBTi, as well as addressing the specific local recommendations made by Buttivant (2014).

- Hospital and community services within Kent should aim to meet BFI standards as soon as possible.

9.1   Data Sources

Attempts were made to provide more wide ranging and detailed analysis than is presented in this report, particularly around outcomes for both mothers and babies. Whilst the Kent Integrated Dataset allowed significant advances in the types of analysis that have been possible for this needs assessment (e.g. analysis of service usage/costs by lifestyle), we were not able to conduct all of the desired analysis. This is principally due to the non-inclusion of certain datasets in the KID, and in particular registrations of births and deaths and Euroking data.   Without the inclusion of these data sources in the KID it was not possible to explore aspects of outcomes such as premature births, low birth weights, neonatal deaths in the context of factors such as long term conditions and lifestyle of the mother.

Therefore in addition to the recommendations above we would also recommend that:

- Ensuring maternity datasets are included within the KID should be a priority for the LMS. The inclusion of Euroking data within the KID will allow a more detailed analysis to be undertaken in future, including analysis of outcomes. This will enable a robust

evaluation of the impact of any changes made to maternity services within Kent and Medway as a result of Better Births.

9.2 Further Analysis

- It is recommended that the cohort of mothers and babies identified for the analysis of service usage is revisited to provide further longitudinal analysis of service usage and costs, particularly for the babies.

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| Annex A: Methodological approaches

A.1 Kent Integrated Dataset (KID)

The Kent Integrated Dataset (KID) is a person-level dataset covering acute, community, primary care, mental health, social care, out-of-hours and hospice activity in Kent. Within the KID it is possible to link data at person-level (via pseudonymised NHS number), making analysis across services possible.

Data from the KID has been used to analyse the prevalence of various health conditions, smoking, obesity and service usage amongst pregnant women.

A.1.1 Identification of pregnant women

The cohort of pregnant women has been identified via the following approach:

1. **Initial identification of babies, which are then matched to their mother**
   - Babies identified from SUS using admission method 82 or 83
     - This approach excludes planned home births and births in private hospitals
   - Mothers identified using the following approach:
     - Identification of UPRN for the babies
     - Identification of women between 13 and 50 living in these UPRNs

- Where there is only one possible candidate, this individual is assumed to be the mother
- Where there are 2+ candidates hospital admissions, outpatient appointments and GP records are referred to in an attempt to identify which woman is the mother
  - Hospital admissions: Method 31 or 32
  - Hospital admissions: Date of admission matches with the baby
  - Outpatient appointments: Specialty code 501
  - GP events: Pregnancy-related read codes (63 codes)

2. **Identification of labour and delivery hospital admissions**
   o Women with a maternity admission in SUS (admission method 31 or 32), or an admission with a diagnosis code of O60-O84 (ICD10)
3. **Cross-matching of lists generated via approaches 1 and 2 above**
   o Only women identified via both approaches added to the final dataset
4. **Restriction to Kent residents of babies born between April 2015 and March 2016**

This results in the identification of 11885 women who had 12024 live babies between April 2015 and March 2016. It is estimated that this represents around 70% of the births over this period recorded on the ONS birth register[9].

A.1.2 Long term conditions

The existence of long term conditions has been investigated using GP data. For the cohort of 11885 pregnant women identified above, GP records are available within the KID for those attending 140 GP practices (8937 women). It is estimated that this represents around 53% of the births over this period recorded on the ONS birth register[10].

The tables below provide a comparison of the profiles of the women identified using the KID and the known profile from the ONS birth register. They demonstrate that the cohort of women identified is broadly representative in respect of geography, age and deprivation.

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[9] Estimated using numbers of registered births for January to December 2015.
[10] Estimated using numbers of registered births for January to December 2015.

CCG of residence	ONS birth register	KID (All records)	KID (with GP records)
Ashford CCG	8%	8%	7%
Canterbury & Coastal CCG	11%	11%	12%
DGS CCG	20%	19%	25%
South Kent Coast CCG	14%	12%	11%
Swale CCG	7%	7%	6%
Thanet CCG	12%	10%	10%
West Kent CCG	28%	33%	28%

Age of mother	ONS birth register	KID (All records)	KID (with GP records)
Under 20	6%	4%	4%
20-24	16%	15%	15%
25-29	25%	30%	30%
30-34	29%	31%	31%
35-39	17%	17%	16%
40+	9%	4%	4%

Deprivation	ONS birth	KID	KID
1 - most deprived	32%	26%	28%
2	22%	21%	21%
3	16%	20%	18%
4	16%	18%	18%
5 - least deprived	13%	16%	15%

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The long term conditions included in this analysis are as follows:

- Alcoholic liver disease
- Cancer
- Cardiovascular conditions (AF, CHD, CVD or HF)
- CKD
- CLD
- Diabetes
- Epilepsy
- Hepatitis
- Hypertension
- Hypothyroidism
- LD
- Mental health conditions (anorexia, bulimia, anxiety, depression or 'mental health')
- Migraine
- MS
- Respiratory conditions (asthma, bronchiectasis, bronchitis, COPD)
- Rheumatic heart disease
- Thyrotoxicosis

For those pregnant women registered with participating practices, GP records have been used to determine which of the above conditions they have been recorded as having prior to conception (estimated as baby's birth date minus 280 days), newly occurring during pregnancy, and newly occurring in the 6 months following pregnancy[11].

A.1.2   Gestational Diabetes

An attempt has been made to identify women developing gestational diabetes using the GP data contained within the KID. Those women recorded by their GP under the following read codes have been included as having developed gestational diabetes:

- Pregnancy + diabetes mellitus - L180
- Preg.+diabetes mellitus unspec - L1800
- Preg.+diabetes mell.-delivered - L1801
- Preg.+diabetes-del.+p/n comp. - L1802
- Preg.+diabetes-not delivered - L1803
- Preg.+diabetes mellit.+p/n com - L1804
- Pre-ex diab mell/insuln-depend - L1805
- Pre-ex diab mel non insuln-dep - L1806
- Pre-ex malnutrtn-rlat diab mel - L1807

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[11] Please note that for deliveries during the early months of 2016, complete data may not have been available at the time of analysis for the full 6 months.

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- Diabetes mel aris in pregnancy - L1808
- Gestational diabetes mellitus - L1809
- Preg.+diabetes mellitus NOS - L180z

Using this approach, 4.5% of the cohort of 8937 pregnant women were identified as having gestational diabetes. It must be borne in mind when interpreting the analysis conducted using this approach that this may well be an underrepresentation of the true level of gestational diabetes, since identification is completely reliant on the GP allocating one of the above listed read codes to the woman's record.

A.2 Euroking

Euroking data was provided by Dartford and Gravesham NHS Trust (DGT), East Kent Hospitals University NHS Foundation Trust (EKHUFT) and Maidstone and Tunbridge Wells NHS Trust (MTW), but not Medway Foundation Trust (MFT). The information provided differed in respect of the timescales covered, with the data provided by DGT covering April 2015 to August 2016, the data from EKHUFT covering April 2014 to December 2015, and the data from MTW covering April 2016 to October 2016. There were also inconsistencies in the data fields provided.

For this reason data extracted from Euroking should be treated as indicative only.

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