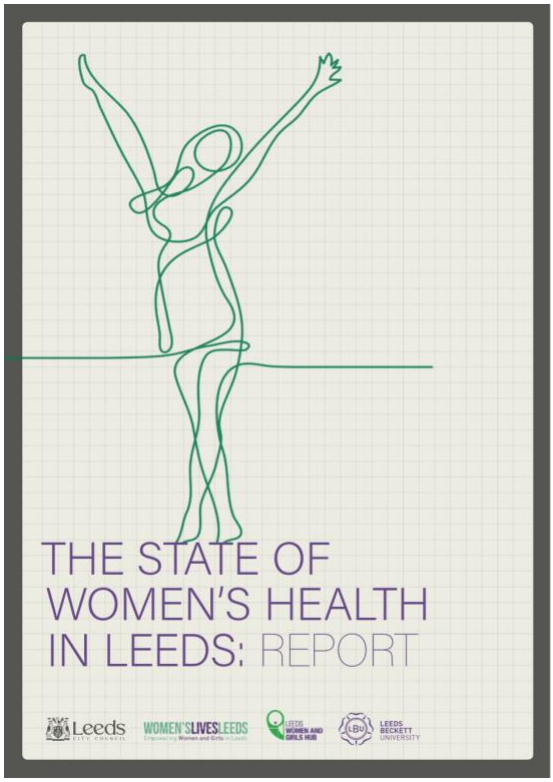

White A., Erskine S., and Seims A (2019) The State of Women's Health in Leeds, Leeds City Council, Leeds

7. Physical health

7.1 Introduction

There are a wide range of health issues that can affect women either uniquely as a result of their reproductive biology or have a significant impact on their overall state of health. This section explores the impact of cancer, cardiovascular, respiratory disease, diabetes, falls and accidents, and issues relating to bone and joint health. Health conditions relating to reproductive and maternal health are discussed in Sections 15 and 16.

7.2 Cancer

Cancer (neoplasms) resulted in 69,930 deaths in women across England and Wales in 2016 – 26% of all deaths (ONS 2018a). In Leeds, over the three-year period 2014-2016 there were 2,614 female deaths as a result of cancer (which is a similar proportion of 26% of all deaths over this period). The rate of death as a result of cancer over this period in Leeds was 243.5 per 100,000, but 30% higher in deprived areas (303.8 per 100,00) as compared to non-deprived areas (232.1 per 100,000). However, between 2006-2008 and 2014-2016, there has been an 8% decrease in mortality across the city for women of all ages and 16% in women under the age of 75 years (Figure 1). Nevertheless, cancer is still the principal cause of death for women in Leeds.

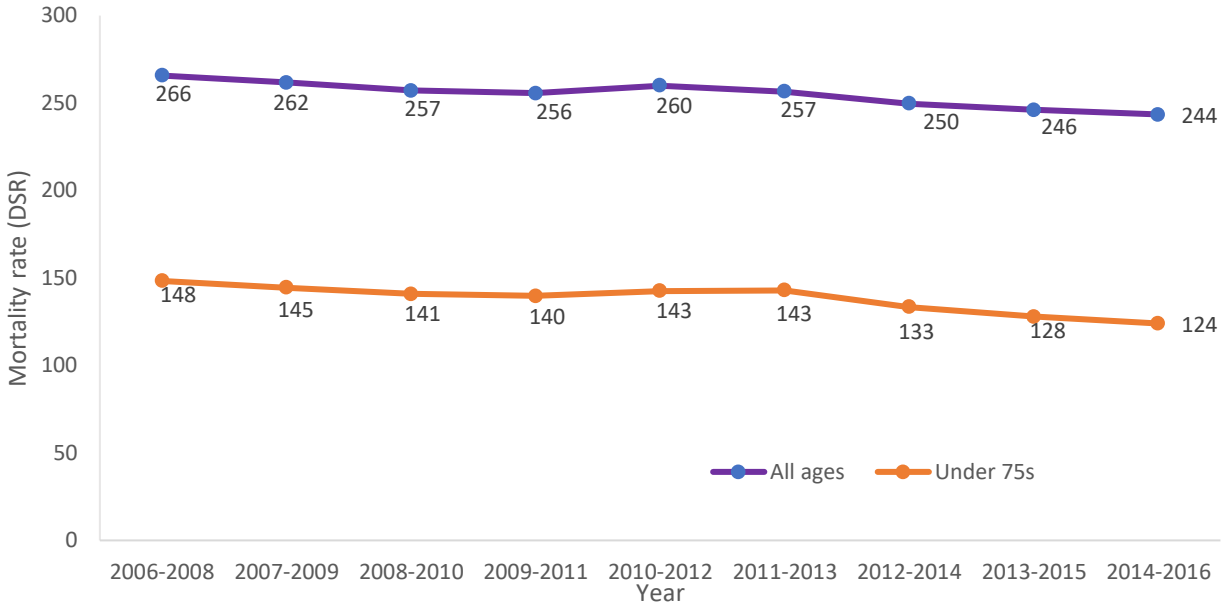

Figure 1 Female mortality rate (DSR) for cancer in Leeds from the period of 2006-2008 to 2014-2016

In 2012-2014 there were 521 female deaths in the most deprived quintile in Leeds as a result of cancer, of which 239 have been calculated to be the excess caused by deprivation (PHE 2016).

With advances in cancer detection and cancer treatment, there are more women survivors, which brings new challenges in dealing with the aftermath of the condition and the treatment. The quality of life of breast and cervical cancer survivors is very dependent on the level of pain and residual disability experienced, especially when it is coupled with financial difficulties as a result of prolonged absence from work (Huang et al. 2017). A longer-term plan of rehabilitation and support is therefore needed for those with complex multi-therapy.

Cancer risk has been found to be higher in lesbian, gay, bisexual, and transgender (LGBT) individuals (Margolies and Brown 2018), as a result of a greater proportion who smoke, have a higher alcohol intake than the heterosexual population, greater incidence of obesity and eating disorders as a result of poor body image and depression, and greater recreational drug use.

The Women's Voices study (Thomas and Warwick-Booth 2018), identified the specific needs of the BME community with regard to cancer, with a lack of

awareness of the signs and symptoms, along with the awareness of services, especially where language and culture are an issue. There was also a recognition of the challenge overcoming stigma and fear, where it is seen as a curse:

"Some people believe that if we don't talk about it, it won't happen"

7.2.1 Lung cancer

Lung cancer is the leading cause of death for women aged 50-79 years of age across England and Wales (ONS 2018a), with 12,952 deaths across England in 2016. This is the same picture in Leeds, with 690 female deaths over the three-year period covering 2014-2016 – a rate of 65.7 per 100,000. This ranged from 7.3 in Bardsey, East Keswick, Collingham, Linton and Harewood, to 185.1 in City Centre, which was nearly three times the rate observed across the city. For women under 75, lung cancer was a cause of mortality in 98 out of 107 MSOAs (92%). For women of all ages, lung cancer mortality (2014-2016, DSR) across Leeds was 65.7, however this ranged from 7.3 in Bardsey, East Keswick, Collingham, Linton and Harewood to 185.1 in City Centre, which was nearly three times the rate observed across the city.

Rates of smoking have been falling faster and for longer in men than for women. Post war there was a steady decline in men smoking, whereas for women the rates were still on the increase. This is reflected in the greater decrease in lung cancer in men, with women still seeing the effects on their higher rates with rising lung cancer rates. In Leeds a symptom awareness campaign aimed at both the general public and Primary Care staff had a marked effect on the number of community-ordered chest X-rays, with nearly 81% more being screened in 2015 as compared to 2008. There was also a significant increase ($p>0.0001$) in the number of people diagnosed with earlier stage cancer (Kennedy et al. 2018). However, despite this being successful with men (with a growing difference between mortality nationally and in Leeds), the rate of mortality in women rose slightly over this time period, with no fluctuation during the campaign (Figure 2). It is important to note that in 2017 women's mortality in Leeds was the same as the national average for men.

Women are more likely to develop adenocarcinoma (non-squamous cell lung cancer) (Lortet-Tieulent et al. 2014), which develops in the outer regions of the lung. These don't have the same effect on coughing as the male type, and therefore tend to be more advanced before being identified. Women are also more likely to experience fatigue, shortness of breath (due to the size of the growing tumour) or chest or back pain due to metastatic spread. However, once symptoms emerge there is a similarity between men and women in seeking help, with an equal likelihood of delay as a result of culturally-embedded moral frameworks of stoicism and responsible service use (MacLean et al. 2017).

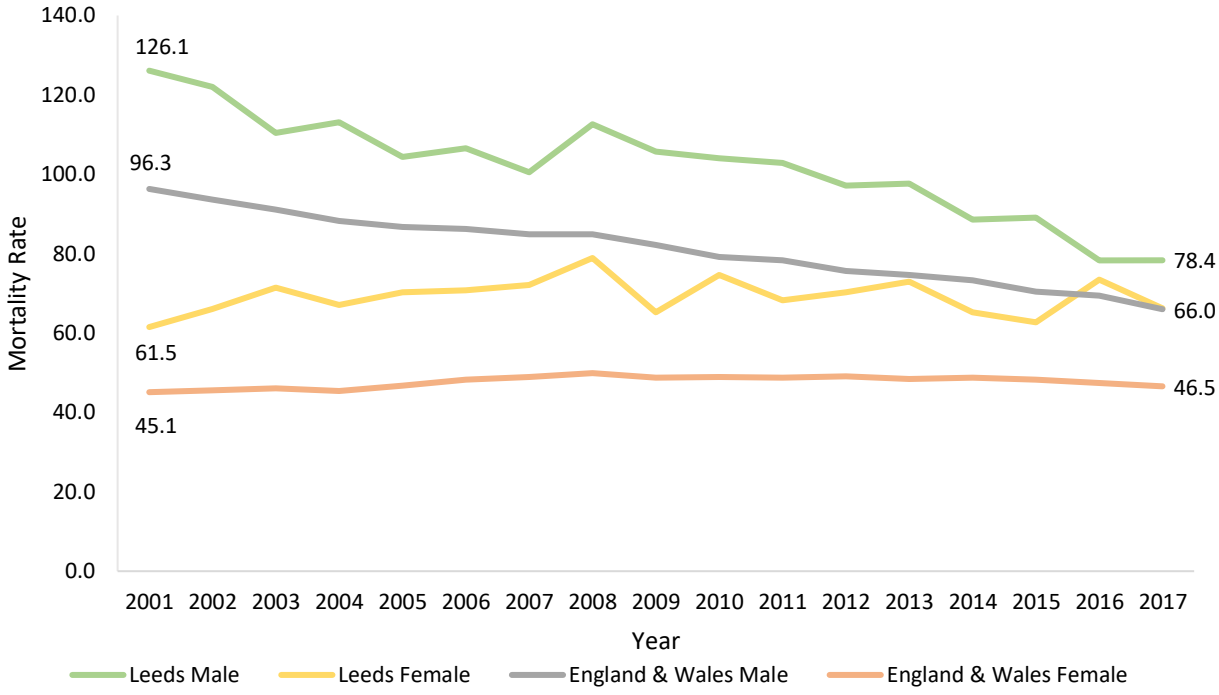

Figure 2 Rate of death (per 100,000) for lung cancer, by sex, for Leeds and England & Wales, 2001 – 2017

Lung cancer is strongly linked to smoking and to deprivation (Figure 3), with more women being identified with lung cancer in decile 1 (most deprived) than men (83.8 per 100,000 as compared to 65.2 per 100,000) – this rate is also much higher than for women in the most affluent parts of the city (29.4 per 100,000).

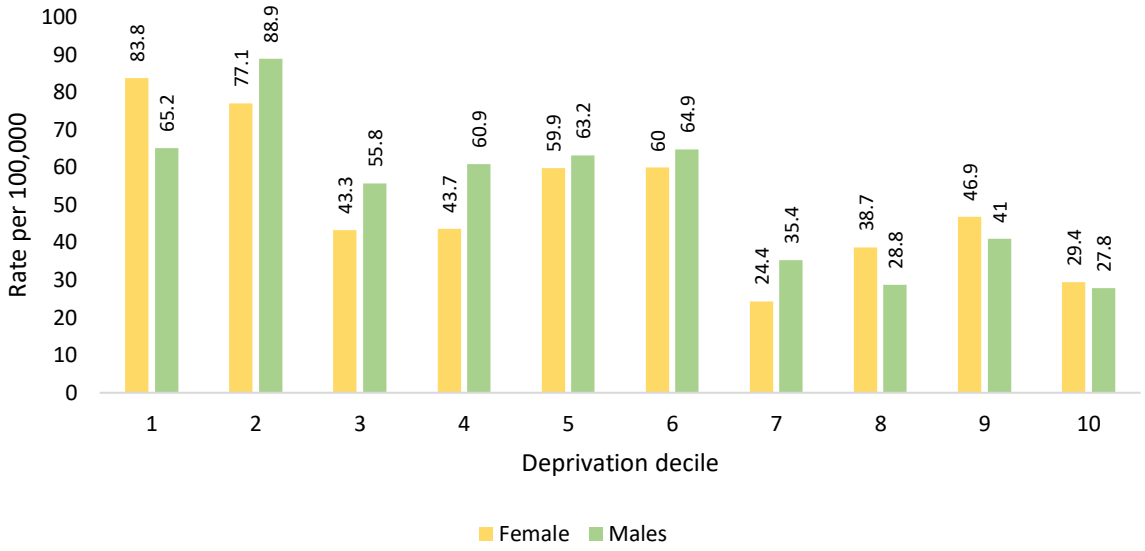

Figure 3 Lung cancer prevalence, rate per 100,000, by deprivation, Leeds, 2018

There is emerging data from the Dutch-Belgium NELSON lung cancer trial, showing that women are more likely to benefit from lung cancer screening, with mortality in women decreasing by 61% compared to a decrease of 26%, in men (ACR 2018).

7.2.2 Breast Cancer

Breast cancer resulted in 9,613 deaths across England in 2016 and is the leading cause of death for women aged 35-49 years in England and Wales (ONS 2018a). Across England, the 1 year survival for breast cancer is 95.6% and 84.9% for 5 years; in West Yorkshire it is 95.3% and 84.7% respectively for patients diagnosed 2008-2010 (ONS 2017). There has been a welcome decrease of 27.6% in mortality rate across Leeds from 39.5 per 100,000 in 2006-2008 to 28.6 per 100,000 in 2014-2016 (Figure 4). Most recently, the mortality rate ranged from 6.6 in Alwoodley West to 105.7 in Belle Isle North, which was over three times the rate across the city. For Leeds, over the 2014 to 2016 period there were 306 deaths.

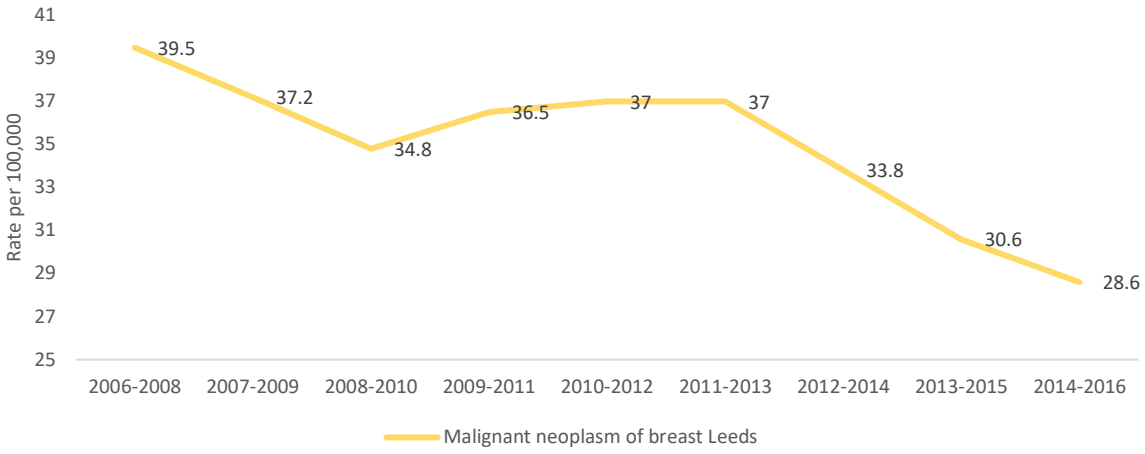

Figure 4 All Ages Breast Cancer Mortality DSR, Leeds - Females

It is estimated that about 27% of cases of female breast cancer in the UK are linked to lifestyle and environmental factors, such as obesity, smoking, alcohol consumption, and lack of physical activity (Parkin et al. 2011). Family history has also been shown to be associated with an increased risk of developing breast cancer (Kartal et al. 2018), with an important role for health professionals to counsel women with first degree relatives with the disease. What is notable is that although breast cancer mortality is higher in the more deprived communities the prevalence is higher in the more affluent areas of Leeds (Figure 5). This may be due to increased screening uptake and the identification of an increased range of cancers and an increased survival. The biggest inequalities in screening uptake are found in women from lower socio-economic backgrounds (Douglas et al. 2016).

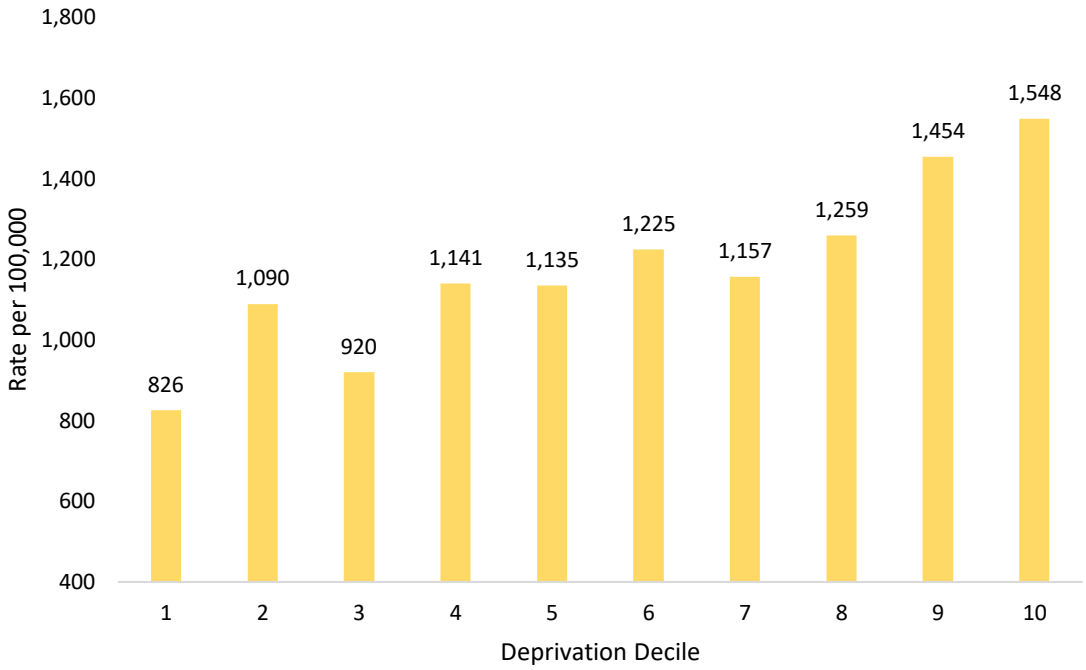

Figure 5 Breast cancer prevalence by deprivation decile, Leeds, 2018

7.2.3 Colorectal cancer

Colorectal cancer is the third most common cancer in women, with a prevalence rate across Leeds of 168.4 per 100,000 women. Bowel cancer is a widespread disease for women of all ages in Leeds, with mortality in 91 out of the 107 MSOAs (85%). Bowel cancer mortality (2014-2016, DSR) across Leeds was similar to the national average with 21.9 as compared to 21.4 per 1000,000 across England in 2016 (CRUK 2016a) (Figure 6). The rate of mortality deaths has decreased in males over the past decade, but has seen a slight increase in females. In the Hyde Park, Burley MSOA, the rate was 120.0 per 100,000, which was nearly six times the rate observed across the city and almost twice as high as the MSOA with the second highest rate.

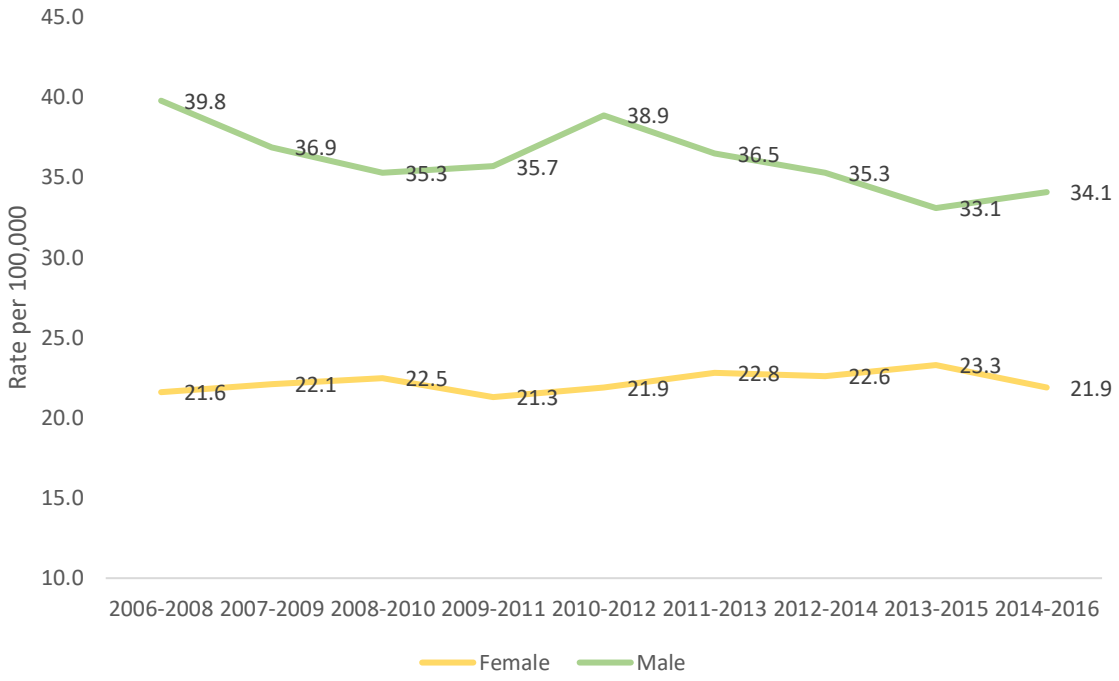

Figure 6: Mortality from malignant neoplasm of colorectal cancer, Leeds, 2006-2008 to 2014-2016

The risk of developing colorectal cancer is increased with diets high in consumption of red and processed meat (Bates et al, 2016) and alcohol (Schütze et al, 2011); with smoking (Wei et al. 2017) and low levels of physical activity (Shaw et al. 2018) and excessive visceral fat (Moghaddam et al, 2007; Bassett et al, 2010; Marino et al, 2011) – all of which are amenable to preventative action. Women do have a biological advantage over men with regard to cancer as a result of the protective effect of oestrogen (Micheli et al, 2009; Murphy et al, 2011; Caiazza et al, 2015; Lavasani et al, 2015). However, women tend to develop colorectal cancer a decade older than men, when there are more co-morbidities to contend with that can mask the signs and symptoms of the disease (Chacko et al. 2015; White et al. 2018a) – this highlights the importance of engaging in bowel screening (see section 15.1.3 on bowel cancer screening).

7.2.4 Cervical cancer

Cervical cancer is 4th most frequent malignant cancer globally (Small et al. 2017), and the 13th most common cancer in women in the UK (CRUK 2017a) resulting in

682 deaths across England. In Leeds, the rate of death over the 2014-2016 period was 2.1 per 100,000 (24 deaths).

Across England the 1- and 5-year survival is 82.5% and 65.3% respectively; in West Yorkshire it is 83.9% and 67.5% (ONS 2017). Cervical cancer is one of the few cancers that is a result of a preventable infection. The human papillomavirus (HPV), is a contagious infection, mostly transmitted via sexual intercourse, and is very common, meaning that most sexually active people will be at risk. This virus can also cause cancer of the vulva, vagina, anus and rectum (Williams et al. 2017). It is also an important cause of oral cancer in women who have sex with women (Saunders et al. 2017). There have been marked reductions in cervical cancer as a result of the introduction of the human papillomavirus (HPV) vaccination.

Women from ethnic minority backgrounds have a higher share of cervical cancer, and as there is an issue in getting young ethnic women to take up the HPV vaccination, the gap is set to increase (Batista Ferrer et al. 2016; Chan and So 2017; Johnson et al. 2017).

There is a growing literature on the risk of cervical cancer in lesbian women and women who have sex with women (WSW), with an urban myth that they are not at risk as they don't have sex with men. As the HPV virus can be passed between women, unscreened women are left at an increased risk (Eaton et al. 2008; Waterman and Voss 2015; Margolies and Brown 2018). A review of lesbian and bisexual women's gynaecological conditions found that bisexual women were more likely to have cervical cancer than the heterosexual population (Robinson et al. 2016).

There is a need to keep the public's awareness of cervical cancer high, as this is a mostly preventable and treatable cancer. The WHO have recognised that it is important that men are better informed of women's risks of cervical cancer and have created a practice sheet on their role in prevention (WHO 2014). There have been few studies that have explored men's awareness of cervical cancer A recent study from Korea, reaffirms the need to ensure men understand the risk women are under,

as in this study they seem very un-informed, either about its causes or how it can be detected etc. (Kim et al. 2018).

7.2.5 Ovarian Cancer

Ovarian cancer is the 6th most common in females, with over half diagnosed in women over 65 years of age, with the numbers expected to increase by 15% by 2035 (CRUK 2017b). In 2016, there were 3,492 deaths as a result of ovarian cancer across England. In Leeds, the prevalence rate for ovarian cancer is 114.9 per 100,000 women, with a mortality rate of 7.26 per 100,000 in 2017 (England 11.6 per 100,000) (Figure 7), with a steady decline in mortality rate.

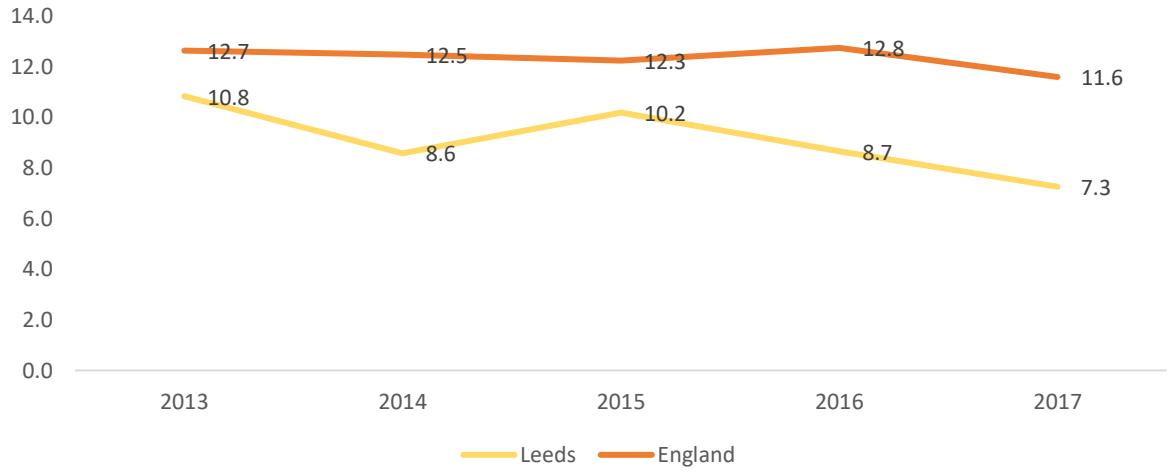

Figure 7 Mortality rate, ovarian cancer, Leeds and England, 2013-2017

There is uncertainty about the possible causes of ovarian cancer, but the ones most usually cited (CRUK 2016b; Reid et al. 2017) include older age, inherited faulty genes, hormone replacement therapy and having previous history of breast cancer-environmental factors such as exposure to asbestos, the use of talcum powder and cigarette smoking may also be risk factors. Protective factors have been found to include breast feeding, childbirth, and taking the contraceptive pill.

There is a need for greater symptom awareness in the community, and increased GP dexterity with differential diagnosis. It is also worth remembering that a surprising number of women under 30 develop ovarian cancer, and women with two or more

relatives on the same side of the family typically develop the disease under the age of 50.

A recent meta-analysis from America (Henderson et al. 2018) supports the low benefit of a screening programme for ovarian cancer.

7.3 Diseases of the Circulatory system

Diseases of the circulatory system, which include cardio-vascular and cerebro-vascular disease, account for 64,849 female deaths across England and Wales; 24% of all deaths (ONS 2018a). Across Leeds (2014-2016) for women of all ages, circulatory disease mortality rate was 217.9 per 100,000, with a steady decrease in women dying from coronary artery disease between 2006-2008 and 2014-2016 - a 27% reduction in deaths in women of all ages and a 32% reduction in deaths in women under the age of 75 years (Figure *8*).

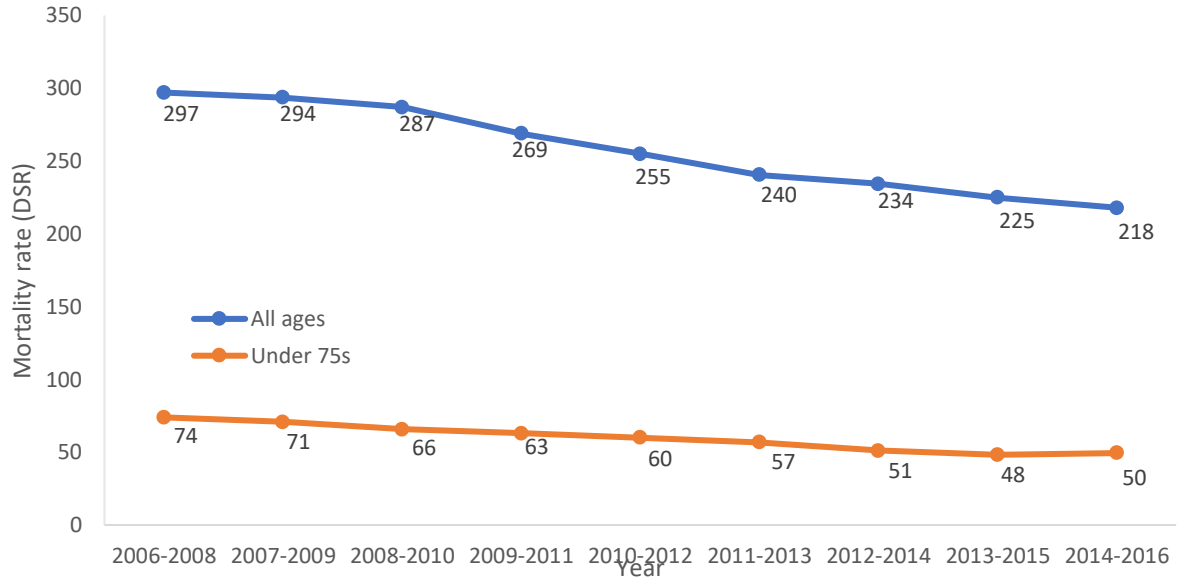

Figure 8: Female mortality rate (DSR) for circulatory disease in Leeds for the period of 2006-2008 to 2014-2016

There is a great variance across the city, ranging from zero deaths in City Centre (with a predominantly younger population) to a rate of 661 per 100,000 in Headingley Central. In 2012-2014 there were 524 female deaths in the most deprived quintile in Leeds as a result of circulatory disease, of which 228 have been calculated to be the excess caused by deprivation (PHE 2016).

There is important new research emerging with regard to sex and gender differences in cardiovascular disease, with differences in epidemiology, clinical manifestation, pathophysiology, treatment and outcomes being seen between men and women (Papakonstantinou et al. 2013; EUGenMed et al. 2016; Regitz-Zagrosek and Karaigas 2017). These impact on women's risk of developing coronary heart disease, heart failure and cardiomyopathies, hypertension, aortic valve stenosis, and mitral valve problems (EUGenMed et al. 2016). Many of these sex differences are under-recognised within the medical community and by women themselves, leaving them vulnerable to missed diagnosis and appropriate treatment.

7.3.1 Hypertension

High blood pressure (hypertension) is the largest single known risk factor for cardio-vascular disease and related disability (PHE 2017). It increases the risk of heart failure, coronary artery disease and stroke; it can also increase the risk of kidney disease, peripheral arterial disease and vascular dementia. In the UK, it is the third biggest risk factor for disease after tobacco smoking and poor diet.

Women can be younger when they develop high blood pressure and it can have serious implications for their health, especially if they are overweight and are smokers. Blood pressure can increase during pregnancy, leading to gestational hypertension, and pre-eclampsia (NHS 2018), which can have important implications for both mother and child.

Although men are more likely to be hypertensive during their adult life, after 65 years more women have the condition, with 31% of men and 26% of women affected across the UK (PHE 2017). Across Leeds there were 14,705 per 100,000 females and 15,637 per 100,000 males diagnosed with hypertension in 2018. There is a strong link between hypertension and deprivation (Figure 9), with a higher prevalence in the most deprived areas of the city, with the highest rates found in Middleton and Westwoods (20,226 per 100,000), Harehills Triangle (19,928 per 100,000) and Lincoln Green and Ebor Gardens (19,817 per 100,000).

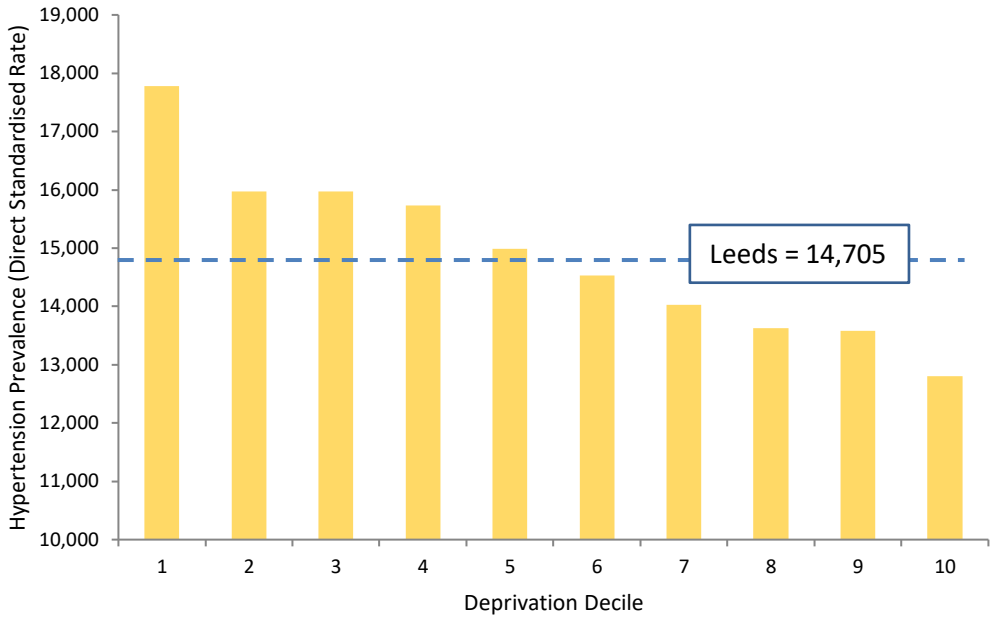

Figure 9 Prevalence of hypertension (DSR) in women, by deprivation decile, 2018 (errors bars represent the lower and upper confidence intervals)

It is important to get more of the population tested, as it is estimated that half of the population do not know their blood pressure (PHE 2017). In Leeds is running Blood Pressure Wise, which is study funded for two years by the British Heart Foundation. It is being delivered within the Council, primarily within the manual workforce, but also in Community Pharmacies where they are engaging mostly women.

At the moment 300+ women have engaged out of 740 and out of those women, about 10% of them were found to have hypertension which means they would have been offered home monitoring equipment and told to get a formal diagnosis from their GP.

7.3.2 Coronary Heart Disease

Coronary heart disease tends to occur later in women's lives, but is the second highest cause of female deaths (after Dementia and Alzheimer's disease), accounting for 22,359 deaths across England and Wales (ONS 2018a).

In the top ten ranked MSOAs in Leeds for coronary heart disease mortality, Headingley Central (256.1 per 100,000), Holbeck (220.9) and Burley (214) were the highest, and well above the city rate of 90 per 100,000. For women under 75, circulatory disease was a cause of mortality in 105 out of 107 MSOAs (98%). Circulatory disease mortality (2014-2016, DSR) across Leeds was 49.5, however this ranged from 7.4 in Wetherby West to 184.2 in Halton Moor, Wykebecks.

Pre-menopausal women have a higher resistance to coronary heart disease, generally developing the disease 10 years after men (Regitz-Zagrosek and Karaigas 2017). This is also seen in Leeds, where the CHD mortality rate was 21.8 per 100,000 in the under 75 year female population (with Headingley Central again being the highest at 129.8 per 100,000).

In those aged under 75 years, women's risk of dying as a result of cardiovascular disease increases with poverty, but not to the same extent as men's (NHS Digital 2018). Despite this advantage, across Leeds women living in deprived areas still had a 50% higher risk of dying of circulatory disease.

7.3.3 Cerebro-vascular disease

Cerebro-vascular disease covers a range of conditions, including cerebral infarction, stroke, subarachnoid haemorrhage, and occlusion. Overall, women have a higher mortality in their older years. In 2016, there were 209 female deaths and 155 male deaths in Leeds (ONS 2018b) (Figure 10).

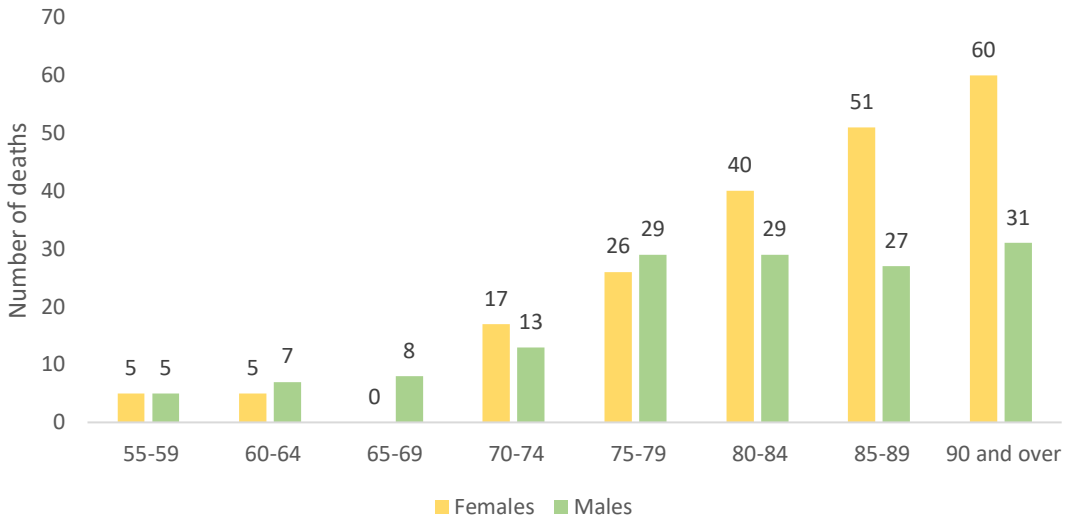

Figure 10 Deaths due to Cerebro-vascular disease, Leeds, 2016 (ONS 2018g)

Across Leeds stroke mortality was 33.4 per 100,000 female population, but this rose to 93.7 in Belle Isle South and 92.6 in Thornbury.

7.4 Respiratory disease

Across Leeds, mortality for all respiratory diseases (excluding pneumonia and influenza) accounted for 853 female deaths – a rate of 77.5 per 100,000, with an overall rate of 139.6 in deprived areas compared to 65.3 per 100,000 in the non-deprived areas. The lowest mortality was seen in Alwoodley West (12.5) and highest in Little Woodhouse (275.7), having a rate which was over three times the rate observed across the city.

In 2012-2014 there were 328 female deaths in the most deprived quintile in Leeds as a result of respiratory disease, of which 206 have been calculated to be the excess caused by deprivation (PHE 2016).

Sex differences are evident in some of the main respiratory disorders including asthma, chronic obstructive pulmonary disease (COPD), cystic fibrosis (CF) and non-CF-related bronchiectasis. The main causes of this are genetic predisposition, sex hormones and comorbidities (including a poorer nutritional status and increased incidence of anxiety and depression, which can affect poor asthma control and quality of life) (Raghavan and Jain 2016).

7.4.1 Bronchitis, emphysema and other chronic obstructive pulmonary disease (COPD)

With 12,743 deaths in women across England, this is a bigger cause of mortality than breast cancer but does not tend to get the same attention. For women of all ages, COPD was a cause of mortality in 103 out of 107 MSOAs (96%). In Leeds, 579 deaths were from COPD over the 2014-2016 period (a rate of 53.7 per 100,000), with a range of 110.8 in deprived areas through to 42.6 in the non-deprived areas by deprivation decile, and the mortality rate in Cross Green, East End Park and Richmond Hill being over three times the rate observed across the city at 189.9 per 100,000. For women under 75, COPD was a cause of mortality in only 85 out of 107 MSOAs (79%). COPD mortality (2014-2016, DSR) across Leeds was 21.2 however this ranged from 7.4 in Wetherby West to 132.3 in Little Woodhouse, which was over six times the rate observed across the city.

Women are developing COPD earlier despite a lower dosage of smoking (Sansores and Ramírez-Venegas 2016; Jenkins et al. 2017). With as many girls as boys smoking, there may be a more negative effect on a girl's lung function due to their smaller size.

7.4.2 Asthma

For women of all ages, asthma was a cause of mortality in 27 out of the 107 MSOAs (25%). Asthma mortality (2014-2016, DSR) across Leeds was 2.9 however this ranged from 3.4 in Ireland Wood, Lawnswood to 21.2 in East Ardsley, which was over seven times the rate observed across the city. For women under 75, asthma was a cause of mortality in 12 out of 107 MSOAs (11%). Respiratory disease mortality (2014-2016, DSR) across Leeds was 1.3 however this ranged from 7.6 in Swarcliffe to 23.3 in East Ardsley, which was almost eighteen times the rate observed across the city.

Boys tend to have higher levels of asthma pre-puberty, but then the numbers of girls affected is greater, with adult women having more severe asthma and a later onset than men (Fuseini and Newcomb 2017) (Figure 11). This may be the result of the female sex hormones impacting on allergic responses in the airways.

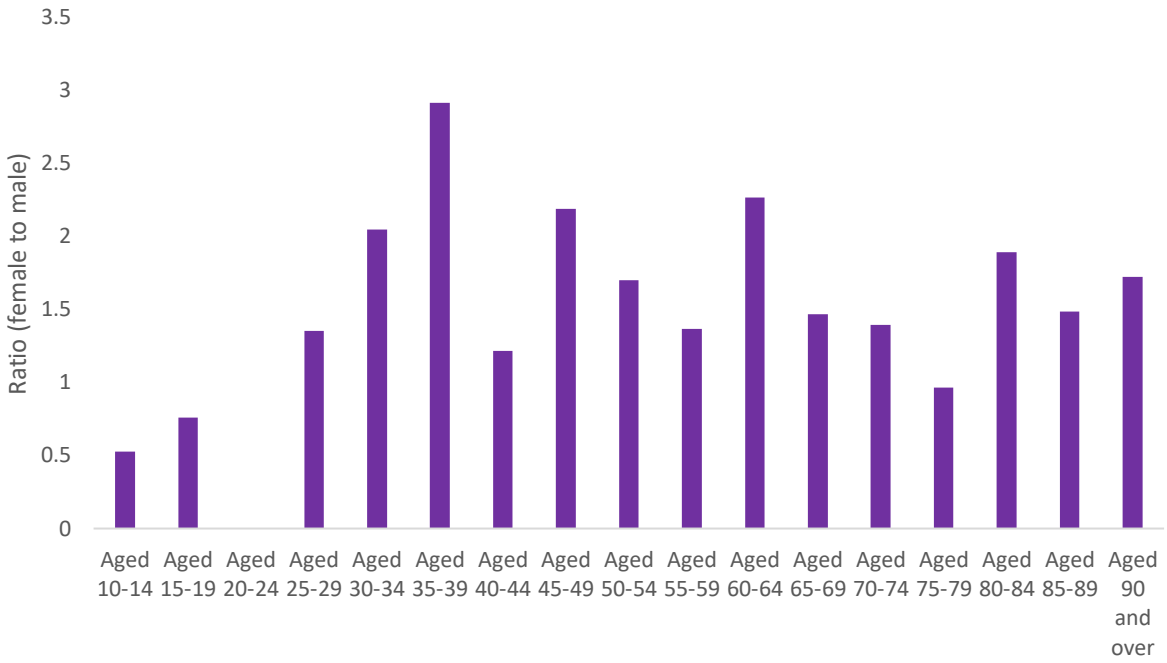

Figure 11 Ratio of female to male rate of death, Asthma, England, 2016

An American study (Lu et al. 2016) found that being overweight and obesity was associated with greater risk of prevalence of asthma in adolescent girls, but not for boys. There was also no difference in the severity of asthma in girls who had a high level of fitness, which was the converse as seen in boys-this suggests that as boys got fitter, their asthma improved, but this was not the case for girls.

There is evidence that asthma may get worse during pregnancy and is associated with problems to both the mother and also has implications for the risk of asthma in their offspring (Charlton et al. 2016; Ali et al. 2018; Liu et al. 2018). It is important that women who suffer from asthma are monitored and have good control through their pregnancy. Rates of asthma are also increased over the perimenopause period and in post-menopausal women who were using menopausal hormone therapy (Zemp et al. 2012; Triebner et al. 2016).

7.4.3 Cystic fibrosis

Cystic fibrosis is a metabolic disease of the lungs that is a life limiting disease, and is more severe in females, with peak exacerbations coinciding with the monthly menstrual cycle (Raghavan and Jain 2016). Women also have a higher mortality from cystic fibrosis than men (Figure 12).

Figure 12 Deaths from Cystic fibrosis, England, 2016

7.5 Diabetes

There are three forms of diabetes: type 1, which is a result of the body not being able to make the hormone Insulin which is required for normal sugar control; type 2, in which the body cannot make enough Insulin for the body's requirements or doesn't work properly; and Gestational diabetes, which occurs in women whilst they are pregnant, but may clear up after birth (NHS 2016a).

7.5.1 Type 1 diabetes

Across Leeds there are 801 females and 1041 males with type 1 diabetes, with the prevalence increasing by deprivation (Figure 13).

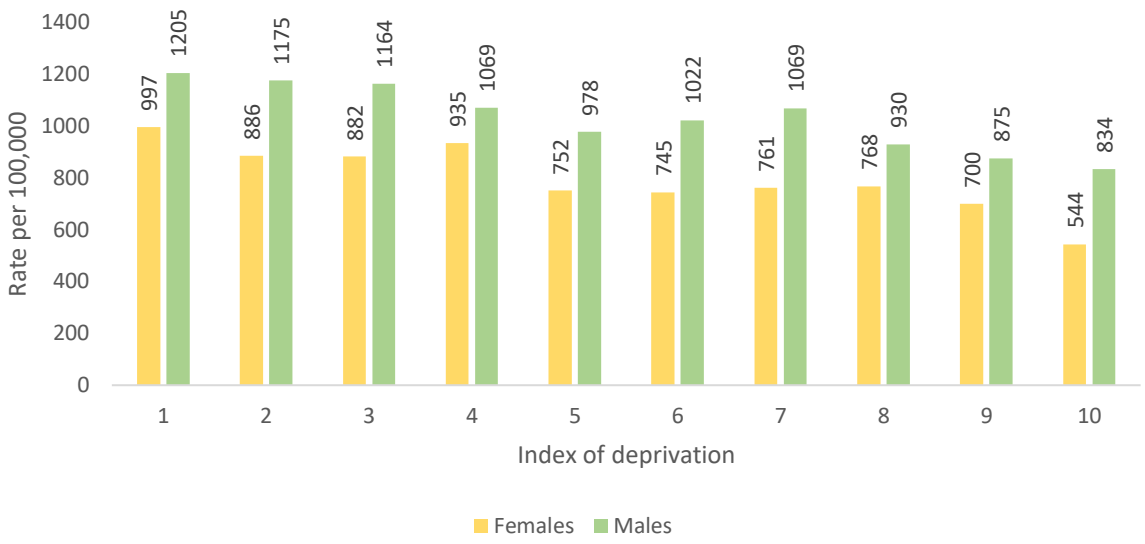

Figure 13 Prevalence of type 1 diabetes, by index of deprivation, Leeds, 2018

Type 1 diabetes usually starts during childhood and unlike type 2 diabetes (which is mostly a lifestyle related disease) is a result of the body not being able to produce insulin. It has important consequences for the health of women, with those women affected having a marked increase in the risk of developing cardio-vascular disease and other health conditions; it also has important implications for a women's fertility and pregnancy risks.

"Women with type 1 diabetes have a roughly 40% greater excess risk of all-cause mortality, and twice the excess risk of fatal and nonfatal vascular events, compared to men with type 1 diabetes." (Huxley et al. 2015)

Girls developing type 1 diabetes in childhood tend to be more severely affected physiologically than boys, with more vascular problems in early adulthood (Samuelsson et al. 2016). Teenage girls are found to have poorer glycaemic control of diabetes, which has been attributed to depression and psychological problems (Forsander et al. 2017), but may also be a consequence of a more pronounced auto-immunity factor or hormone related (Samuelsson et al. 2016; Turtinen et al. 2018). The guidance would seem to suggest that girls (and boys) need more targeted support when they are first diagnosed, and as they go through their teenage years with diabetes.

Type 1 diabetes has a detrimental effect on young women's bone density and increases the risk of fractures in young women (Mastrandrea et al. 2008). However, the longer-term effect may be less than thought, as better control of type 1 diabetes is resulting in more women surviving into older age. A recent study of older American women who have had a diagnosis of type 1 diabetes for over 50 years, found there were actually fewer fractures than the control, non-diabetic population; this suggests that those women who are reaching old age have had better control of their diabetes and other health risks (Maddaloni et al. 2017). Despite this improvement, there are still many women whose control is not optimal, which opens up the possibility of longer term health problems (Swasey et al. 2018).

Type 1 diabetes can have a negatively impact on pregnancy, increasing the risk of having a large baby or a baby with birth defects, as well as potential health risks for the mother. There is a need for women to be given specialist advice both pre-conceptually and throughout the pregnancy (NHS Choices 2018).

7.5.2 Type 2 diabetes

In Leeds there are 4,566 females and 6130 males diagnosed with type 2 diabetes, with a strong link to deprivation (Figure 14).

There are sex and gender differences in the risk, pathophysiology and complications of type 2 diabetes, with significant consequences for women developing the disease through obesity. Pre-menopausal women have a higher level of protection against cardiovascular disease than men, due to the action of the sex-hormones on the circulatory system with diabetes this is lost, opening women up to a greater risk of myocardial infarction and stroke mortality than that seen in men (Kautzky-Willer et al. 2016). The risk of developing diabetes is also increased in post-menopausal women by the loss of lean body mass and a decrease in total energy expenditure (Kautzky-Willer et al. 2016).

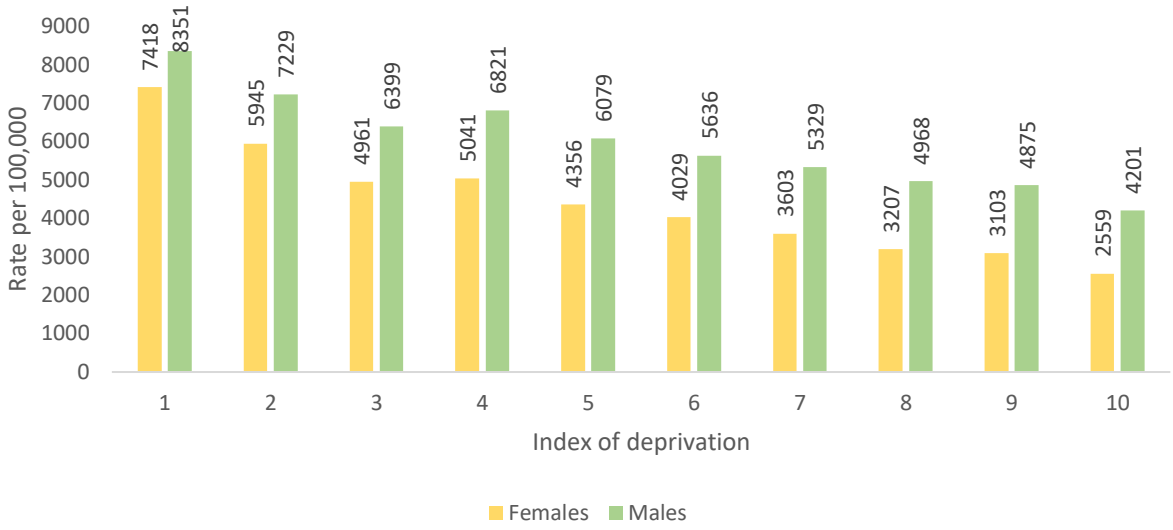

Figure 14 Prevalence of Diabetes type2, by deprivation, Leeds, 2018

Both type 1 and type 2 diabetes can have a negative effect on fertility for both men and women-for women there can be problems with the fallopian tubes, ovaries, uterus and menstrual disorders leading to faulty ovulation (Basmatzou 2016). Conversely, higher parity is linked to greater risk of developing type 2 diabetes (Guo et al. 2017).

Type 2 diabetes is a major health risk for people of South Asian origin, who are between three and six times more likely to develop type 2 diabetes when compared to white Europeans (Hanif et al. 2014). They tend to develop the disease at an earlier age, with an increased prevalence of diabetes-related conditions. There are strong links to traditional South Asian culture that can also impact the management of diabetes. This was an important point raised as part of the Women's Voices in Leeds study (Thomas and Warwick-Booth 2018), in relation to culture and diet:

> *"A health professional came to deliver a health session and used a standard NHS questionnaire to calculate how healthy the women's lifestyle was. The questions around food asked if they ate chocolate and crisps etc. From the women's answers they should have been the picture of health because the questionnaire didn't consider cultural differences-although the women don't eat chocolate* and crisps they eat a lot jalebis (deep fried sugar-coated flour)." (p26)

Women generally tend to have poorer control of their diabetes and experience more psychosocial stress (including economic, environmental, and behavioural components), which is often linked to their obesity (Ding et al. 2009; Kautzky-Willer et al. 2010; Franzini et al. 2013; Rossi et al. 2017). Teenage girls have been found to be the most affected (Forsander et al. 2017), especially if they had an anxiety that their parents were not able to manage their diabetes.

With diabetes being linked to visceral (abdominal) fat, waist size is a key factor in the link between diabetes and overweight (Seo et al. 2017), with a waist size at or above 88cm (35”) in Caucasian women being a more positive indicator of diabetes risk than men’s increased waist size (102cm 40”). For women of Asian origin the waist size where risk increases is lower (80 cm 31.5” women and 90cm 35” for men) (Alberti et al. 2007).

7.5.3 Gestational diabetes and diabetes during pregnancy

The rate per 1,000 births of gestational diabetes calculated over 10 years (2007-2016) was 37.3 across the city and ranged from 21.7 in Pudsey ward to 69.5 in Gipton and Harehills ward, which was nearly double the rate observed across the city.

The impact of gestational diabetes mellitus (type 2) includes a higher risk for:

- Primary caesarean section.
- Preeclampsia.
- Premature delivery.
- Stillbirth, and perinatal mortality.
- Diabetic embryopathy (abortus, congenital anomalies).
- Diabetic fetopathy (macrosomia, birth weight, and body fat above the 90th percentile, fetal hyperinsulinemia) (Kautzky-Willer et al. 2010).

There is also a possibility that existing problems associated with diabetes may be worsened through pregnancy (NHS Digital 2016; NHS Choices 2018). Although it is

possible to have a normal pregnancy and a healthy child, diabetes can cause serious issue for both themselves and their child that need to be carefully considered and managed (Bradley et al. 2016).

Key findings from the Pregnancy and Diabetes Annual report (NHS Digital 2016) for 2016 were:

- 24%of women with type 1 diabetes and 42% women with type 2 diabetes did not present to the joint diabetes antenatal team before 10+0 weeks gestation.
- Delivery by caesarean section was more common in diabetics (65% of type 1 and 57 per cent of type 2).
- Almost one in 10 women with type 1 diabetes had at least one hospital admission for severe hypoglycaemia.
- Ketoacidosis, a high risk for mother and fetus, occurred in 2.7% of women with type 1 diabetes.

In 2016 there were 3,304 pregnancies in 3,297 women with diabetes across England and Wales; of these, 1,608 women had type 2 diabetes, with nearly half being of Black, Asian or mixed ethnicity. Women with Type 2 diabetes also more likely to be older, be more overweight, with a shorter diabetes duration, and more likely to live in areas of social deprivation (NHS Digital 2016). These risks can be reduced, but it requires careful management through the pregnancy, which can put additional emotional and economic cost onto the parents, often when they are facing other financial pressures.

Diabetes UK (Diabetes UK 2018) offer the following advice to women with diabetes who are pregnant:

- Get to know the risks involved and how to reduce them.
- Talk to your GP or nurse.
- Keep your blood sugar to your target levels.
- Check what medication you’re taking, as some can harm the baby.
- Take folic acid every day.
- Get your eyes and kidneys checked.

- Make healthy lifestyle choices – like eating well, cutting down on drinking. alcohol, quitting smoking and getting active.

7.6 Accidents and Falls

For women of all ages, accidents were a cause of mortality in 88 out of 107 MSOAs (82%). Mortality from accidents (2014-2016, DSR) across Leeds was 15.8, however this ranged from 4.3 in Garforth to 111.9 in Little Woodhouse, which was approximately seven times the rate observed across the city. For women under 75, accidents were a cause of mortality in 56 out of 107 MSOAs (52%). Mortality from accidents (2014-2016, DSR) across Leeds was 8.3 however this ranged from 5.5 in Broadleas, Ganners, Sandfords to 79.0 in Little Woodhouse, which was over nine times the rate observed across the city.
Women are at greater risk of falls in their older years, with this being the leading cause of their loss of functional ability, independence and quality of life, and of injury-related death (Kenny et al. 2017). In 2016, across England 2,376 women (2,273 men) died as a result of a fall over the age of 65 years (ONS 2018a). Mortality from falls across Leeds resulted in 96 deaths over the three-year period 2014-2016, a rate of 8.2 per 100,000 population.

For women of all ages, falls were a cause of mortality in 67 out of 107 MSOAs (63%). Mortality from falls (2014-2016, DSR) across Leeds was 8.2 however this ranged from 4.5 per 100,000 in Middleton and Westwoods to 70.3 per 100,000 in Little Woodhouse, which was over eight times the rate observed across the city. For women under 75, falls were a cause of mortality in only 22 out of 107 MSOAs (21%). Mortality from falls (2014-2016, DSR) across Leeds was 2.4, however this ranged from 4.9 in Middleton and Westwoods to 34.9 in Armley, New Wortley which was over fourteen times the rate observed across the city.

Women are at greater risk of emergency admission due to a fall over the age of 65 years (2,000 Leeds women as compared to 926 Leeds men for the year 2017/2018). The 3 year aggregated rate (2015/16 to 2017/18) gives a rate of 2,696.65 per 100,000 for women and 1,833.85 per 100,000 for men across the city. The rate of

falls varies by Local Care Partnership (LCP) (Figure 15), with the Leeds Student Medical Practice (LSMP) seemingly having the higher rate, but this is due to the small number of women over the age of 65 years skewing the data.

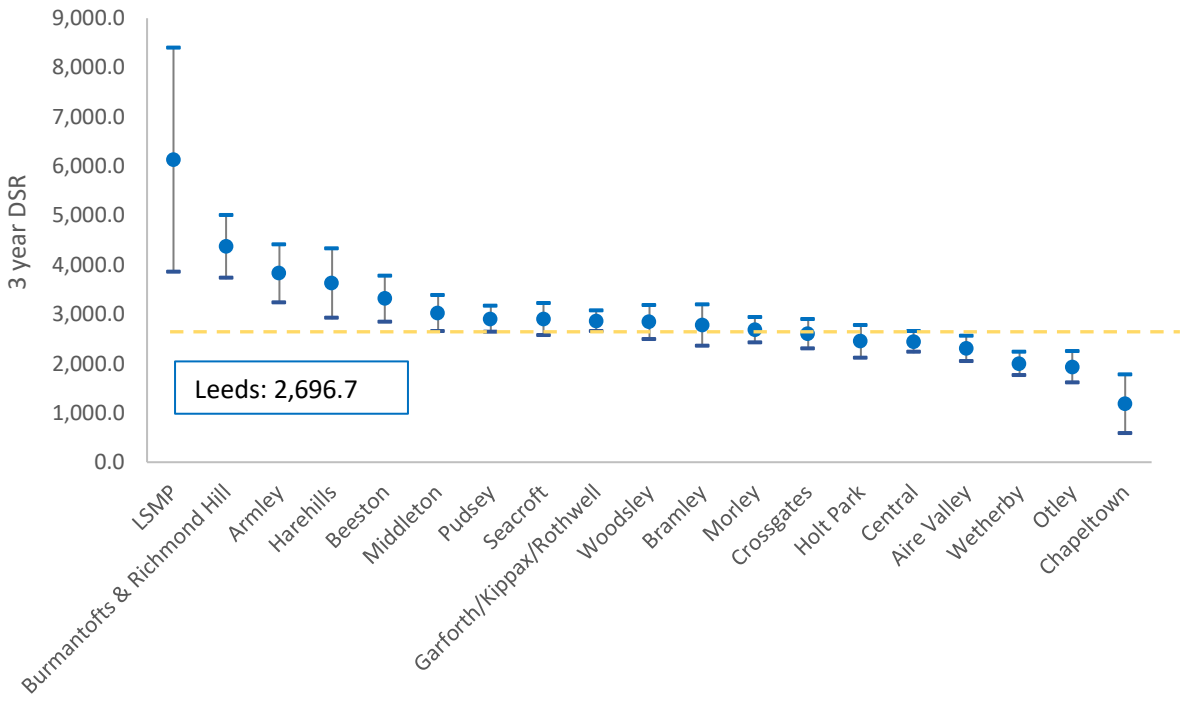

Figure 15 Emergency admissions due to falls, females, 3 year aggregate rate (2015/16 to 2017/18), DSR per 100 000, Aged 65+, Leeds Local Care Partnerships

Those women with a history of falls have a greater chance of mortality following a stroke (Foster 2017). Falls also have a very negative effect on an individual's confidence and willingness to mobilise or to socialise – this can compound the effects of immobility and lead to increasing social isolation and depression.

Many falls are as a result of chronic disease and pain, with the sex-specific factors more associated with falls being women's incontinence and frailty, and multimorbidity (Afrin et al. 2016; Gale et al. 2016). Increasing frailty, with its associated unsteady gait, lack of energy and weakness, is recognised as a consequence of ageing, but does not occur in everyone and can be avoided by preventative action in earlier years (Harmsen et al. 2016). The Australian Longitudinal Study on Women's Health (White et al. 2018b) found that obesity was a statistically significant cause of falls in middle-aged women (50-64 years), along with impaired vision, poor physical functioning, depression, leaking urine, stiff/painful joints, severe tiredness,

osteoporosis and hormone replacement therapy. They note however, that it was often not one single cause, but a “woman’s overall physical and psychological health and well-being reflected in the risk factors, with their risk of falling associated with a dynamic integration of these risk factors” (p 61).

There are also environmental factors (Fenton 2014) that impact greatly on how independence can be maintained as you get older, with ease of getting around reducing the risk (and the fear) of falling.

7.7 Osteoarthritis

Osteoarthritis is recognised as a major cause of chronic pain, associated with exhaustion, social isolation, depression, obesity, and many other serious conditions (Barnett 2018). It is a common condition with over 8.75 million people across the UK seeking treatment, of which over 5 million are women (Figure 16). Osteoarthritis is more prevalent in women than men at every age, but the sex-difference magnifies after the menopause, with over 49% of women and 42% of men over 75 years being affected, demonstrating the effect of the sex-hormones on the disease (Pan et al. 2016; Jin et al. 2017).

In Leeds, there are 28,688 women (21,543 men) with knee osteoarthritis, and 19,864 women (10,472 men) with hip osteoarthritis (Arthritis Research UK 2013). More women than men claim disability living allowance as a result of arthritis (2,490 female claimants compared to 1,150 males in 2018) (NOMIS 2018). Women working in health care, child care, and cleaning have an increased risk of sick leave and disability pension due to knee osteoarthritis (OA) (Hubertsson et al. 2017).

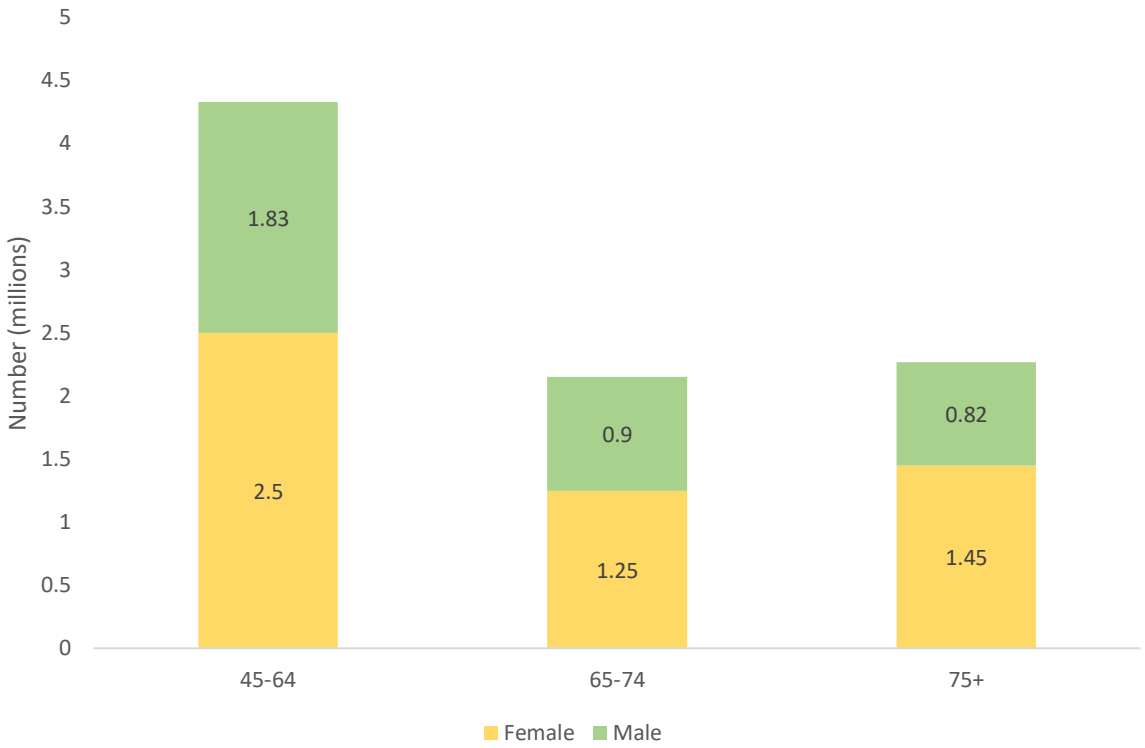

Figure 16 Number of people (millions) who have sought treatment for osteoarthritis, UK, 2013

Osteoarthritis was predominately seen as a disease caused by the erosion of the joints due to hard wear and tear, but it is now recognised as being a much more complicated disease with a higher prevalence in women (Pan et al. 2016; Jin et al. 2017; Barnett 2018; Bortoluzzi 2018). Although there is not yet a full understanding of the causes of osteoarthritis, there is growing evidence that there is a strong immunity-related factor (Kalaitzoglou et al. 2017). The immune response has been found to be different in male and female sufferers (Kriegova et al. 2018), which could explain why more women develop the disease and have a more aggressive form. A link has also been made to the metabolic syndrome (Bortoluzzi 2018), which helps explain the higher incidence of osteoarthritis in obese women and men. There are links to levels of socio-economic deprivation, but this is possibly due to higher levels of obesity in deprived communities, with a Spanish study (Reyes et al. 2015) suggesting up to 50% of the increased risk is due to this weight factor.
Vertebral disc degeneration and other causes of low back pain are more common and more severe in elderly women than in elderly men, most likely as a result of oestrogen deficiency (Wang 2017).

The higher incidence of OA has also been associated with a greater number of physical limitations, with a fear of falling, an increasing number of chronic conditions and poly pharmacy (French et al. 2016) – all of which are more prevalent in women, especially in their older years.

With the same degree of radiographic damage, OA is also more symptomatic in women with osteoarthritis compared to men (Tonelli et al. 2011). Women have significantly more pain, greater pain sensitivity and reduced function than men (Tonelli et al. 2011), even when controlling for variables such as depression, anxiety, pain catastrophising, social support, and physical activity. In addition, they have poorer perceived function, and more impairment on specific functional tasks.

There has been thought to be an association between smoking and osteoarthritis (Felson and Zhang 2015; Kong et al. 2017), but it is now recognised as more of cause of increased muskulo-skeletal pain than increasing the risk of the condition.

7.8 Osteoporosis

Osteoporosis is a condition that is caused by changes to the bone structure and strength leading to an increased fragility and fractures (NHS 2016b). It is estimated that over 3 million people across the UK have osteoporosis (Arthritis Research UK 2018), with over 40% of White post-menopausal women having the condition - with an ageing population the numbers affected are expected to increase (Rachner et al. 2011). Across England, 655 women died as a direct consequence of osteoporosis, but many more are affected by the impact of fractures and the subsequent frailty and loss of confidence that ensues. In Leeds 11,802 women have a diagnosis of osteoporosis (4,290 men) (Figure 17).

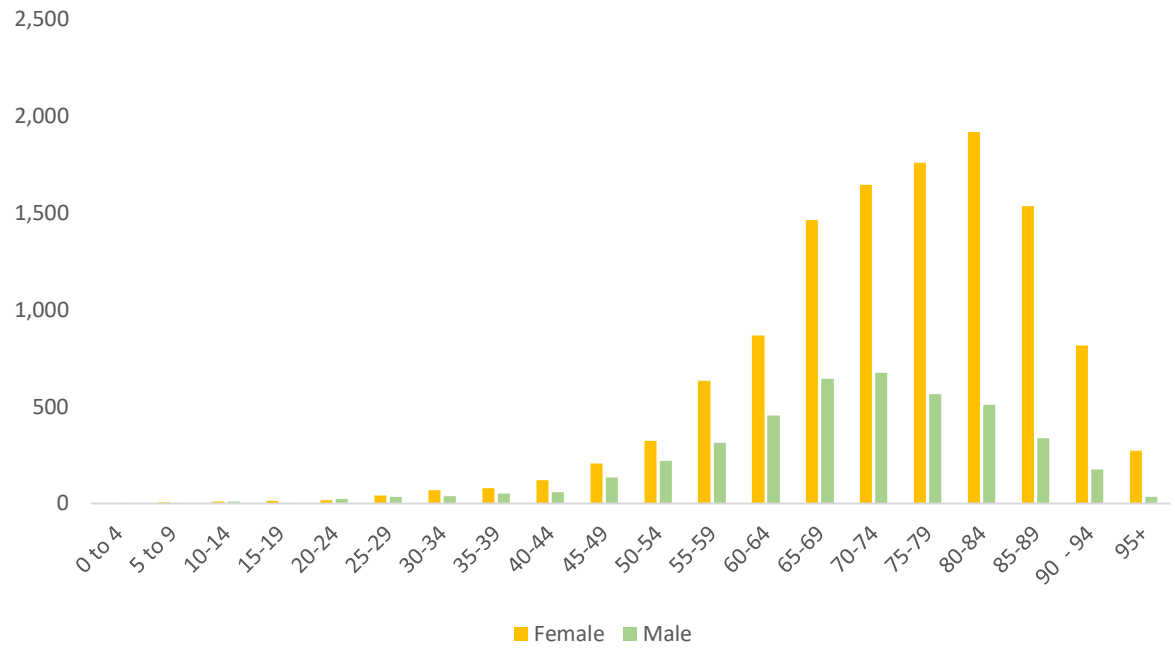

Figure 17 Prevalence of osteoporosis, by age and sex, Leeds, 2018

Osteoporosis can occur throughout adult life as a consequence of pre-existing disease, such as high dose oral corticosteroids, family history, some medical conditions and medications and being underweight, but is also a result of lifestyle factors including being a heavy drinker and smoking (NHS 2016b). However, for women the most rapid bone loss occurs whilst they are transitioning from pre- to post-menopause (Bjørnerem et al. 2018), with post-menopausal women losing an average of 2.5% of their bone per year over the first 5 years due to the loss of oestrogen production (Arthritis Research UK 2018). Many men and women suffer more than one fracture before they are diagnosed, leading to an advancement of the disease when prevention could have been initiated.

Early treatment should be the goal of primary care to reduce the consequences of fractures (Rachner et al. 2011; Nguyen 2017; Ferrari 2018), but prevention should also be seen as important. Fractures can occur anywhere, at any time, with only hip fractures seeming to have a seasonal effect (most in the spring), suggesting that fall prevention should be aimed at all at risk (Costa et al. 2013).
There is also a lack of awareness in adolescent girls as to the risk and the need to build bone strength and avoid smoking etc. (Anderson et al. 2005), with great importance in getting bone density as great as it can be in early years (Chastin et al.

2014) as maximal bone density is acquired by the age of 30 and 90% of bone mass accrued in girls by 18 years of age (NIH 2015).

Although exercise is seen to be very beneficial for good bone health, female athletes are at risk of a problematic triad of osteoporosis, eating disorders and amenorrhea that can leave them with long term bone problems (along with other health issues) (Nguyen et al. 2014).

There is a high prevalence of dementia in women with osteoporosis, which might be a consequence of dementia being diagnosed in women who have fallen (Amouzougan et al. 2017). This cannot account for all the increased prevalence and whilst the exact reason is not known there should be an effort to ensure women with dementia are assessed to help prevent fracture, with all its negative consequences in this cohort of vulnerable women.

The National Osteoporosis Society (NSO 2015) in their Agenda for England recommends that there should be both national and local action, including the improvement of local services to increase provision for those affected and a need to raise awareness of the condition.

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