DIABETES MELLITUS

IN

GLOUCESTERSHIRE

Healthcare Needs Assessment

Executive Summary

This health care needs assessment is supporting the ongoing work of the Diabetes Mellitus Clinical Programme Group (CPG) especially in terms of identifying priorities following its re-launch, in recognition of the implications of the growing burden of the disease which has been specifically acknowledged in the NHS Five Year Forward View (FYFV).

Exploring our local situation in terms of variations in routine care, support and outcomes for people with Diabetes would help us not only identify what our priorities should be, but also put us in good stead in being able to demonstrate improvements in relation to Diabetes.

Burden of Disease

- *The **prevalence of Diabetes is increasing** (being particularly driven by Type 2 Diabetes). Type 1 Diabetes which is an autoimmune condition often runs in families and people with a close relative with the condition have around a 6% chance of also developing the condition. **Type 2 Diabetes** which is **far more common** than Type 1 is often **associated with obesity** and tends to be diagnosed in older people*
- *The **death rate has been following a downward trend in the county** in line with the national picture, with rates generally higher in males. **Mortality is not significantly different** from the national average, neither is it significantly different between districts in-county*
- ***Significant inequalities** exist in the **risk** of developing Diabetes, in **access** to health services and the **quality** of those services, and in **health outcomes**, particularly with regards to people with **Type 2 Diabetes**. Socially excluded people and those with learning disabilities or mental health problems may receive poorer quality care. These considerations are important in informing the designing and commissioning of preventive, treatment, care and support services for Diabetes.*
- *The **QoF prevalence** of Diabetes in county has **steadily increased** with about 31,547 people (17 years and over) on registers in 2014/15. The **variation in prevalence** is demonstrated by 23 GP practices (mainly in Cheltenham and Stroud and Berkeley Vale Localities) having prevalence rates significantly lower than the England average, whilst the 13 GP practices with **significantly higher rates** are evenly split between **Gloucester and Forest localities**. These two localities also have prevalence rates that are significantly higher than the county average. Such variations need to be taken into account when designing, commissioning, delivering and evaluating services. QoF registers do not however give the full prevalence picture, with there being an estimated **37,656 people** aged 16 years and over with **diagnosed and undiagnosed Diabetes** in Gloucestershire.*
- ***Obesity is the most potent risk factor for Type 2 Diabetes** accounting for 80-85% of overall risk, with this meaning that Gloucestershire's prevalence of diagnosed and undiagnosed Diabetes will match the national the national rate by 2035 if current trends in population change and obesity persist.*
- *Most cases of **Type 1 Diabetes** are quickly diagnosed with this accounting for about **10% of all adults with diabetes** with 90% having Type 2 Diabetes. **Type 1Diabetes** which is the most **common type of Diabetes in childhood** is becoming more common. 283 CYP (aged up to 24 years) received treatment for Diabetes in Cheltenham General Hospital and Gloucestershire Royal Hospital in 2014/15, 98.2% of whom had Type 1 Diabetes (higher than the regional and national averages). Though much less common in CYP, **Type 2 Diabetes** appears to be*

increasing *nationally, particularly in* ***South Asians*** *and* ***Black*** *ethnic groups being* ***strongly associated*** *with* ***adiposity and family history****. With some evidence of potential* ***acceleration of complications in CYP with Type 2 Diabetes****, education about the increased risk as well as early and optimal management as well as close monitoring and secondary prevention becomes extremely important in this cohort of CYP.*

- *Direct* ***costs of Diabetes Mellitus*** *takes up 10% of the NHS budget in the UK with* ***80%*** *of this cost attributable to* ***complications – heart disease, excess inpatient stay and kidney disease****. In England, treatment costs accounts for 31% of total costs with complications accounting for 69%.* ***Optimal management*** *to prevent the development of complications is an* ***imperative*** *in terms of* ***effective use of funds****. Gloucestershire would* ***need significant action on improving prevention and current treatment regimes*** *of Diabetes if the projected increase in NHS cost is to be stemmed. Social care cost is not spared as Diabetes is known to double the risk of admission to care homes with the condition accounting for up to one in four residents, with the highest rate of* ***undiagnosed Diabetes in care homes*** *for the Elderly Mentally Infirm. Such care homes will benefit from targeted* ***Diabetes education and support programmes****.*
- ***Gloucestershire spent*** *£11,501,128 on Diabetes in 2013/14 –* ***70.1% on primary prescribing*** *and 11.3% on scheduled care. The county was in the* ***highest quintile*** *nationally in terms of spend per 100,000 for* ***Emergency Transport****, as well as for unbundled* ***high cost drugs and devices****. It however was in the* ***lowest quintile*** *in terms of* ***community and integrated care****. These areas should be explored further in terms of optimal spend. Despite spending 6.4% more than peers on* ***primary prescribing****, Gloucestershire however gets* ***better outcomes*** *for its level of total spend on Diabetes prescribing* ***compared with its peers****. Nonetheless, the county may want to explore how* ***spend per person item on insulin can be further improved*** *without compromising on the good outcomes given the increase in expenditure over the previous year.*
- ***Diabetes is a demanding disease*** *with significant* ***emotional and social burdens****. Psychosocial factors such as* ***depression*** *are found to be* ***stronger predictors of medical outcomes*** *(e.g. hospitalisation and death) compared to factors such as complications, BMI, or HbA1c levels. People with Type 1 Diabetes generally report better physical functioning and more energy than those with* ***Type 2 Diabetes****, whilst adults with Type 2 Diabetes* ***undergoing treatment intensification*** *from diet alone to oral agents to insulin seem to be associated with* ***reduced quality of life****. This therefore has implications for how these patients are supported. Intensification of treatment for adults with* ***Type 1 Diabetes*** *does not seem to affect QoL except perhaps for* ***very intensive treatments*** *with highly* ***demanding self-care regimens*** *and increased incidence of* ***hypoglycaemia****. Men, younger people and those with higher education/ income generally report higher QoL.* ***Additional support*** *may therefore need to be provided for* ***specific groups*** *of people to ensure optimal wellbeing.* ***Coping skills*** *are a* ***critical*** *factor in engendering a positive effect of* ***enhanced well-being****, more active Diabetes* ***self-management****, better glycaemic control, and* ***fewer complications****. The CCG may therefore wish to explore the potential of* ***incorporating coping skills training into the education programme*** *for people newly diagnosed with Diabetes.* ***CYP with diabetes*** *are at high risk of* ***anxiety and depression****, and therefore need* ***early access to mental health professionals*** *who have an understanding of diabetes, when they need it. Despite having a to deal with a complex and demanding daily treatment regime, CYP with*

*Type 1 Diabetes, their **generic** QoL appear not to be impaired when compared to healthy peers.*

Risk Factors

- ***Type1 Diabetes** usually appears **before the age of 40** years with about 85% of adult cases in Gloucestershire in 2014/15 aged under 65 years, and one in four aged under 40 years of age. Appropriate management of this cohort has major **implications for economic wellbeing** as a **significant proportion are of working age**, and should therefore be of focus for the county. Having a close relative with the condition leads to about 6% chance of also developing it. This underscores the importance of close relatives being aware of symptoms of the disease to enable prompt diagnosis and management, should the disease occur in them. Deprivation is **strongly associated** with higher levels of poor lifestyle choices as well as poor blood control which are linked to the **risk of serious complications amongst those already diagnosed** with Type 1 Diabetes.*
- ***Type 2 Diabetes** though occurring mainly in **adults aged 40 years and over**, is now **becoming more common in CYP**. Gloucestershire has a higher proportion of people with the condition in the older age bands compared with the England average. Having a close relative with the condition, **ethnicity** (south Asian, Chinese, and Black) and being **overweight or obese** are also **risk factors***
- ***Women from Black African** groups appear to have the **highest prevalence of obesity** and men from Chinese and Bangladeshi groups have the lowest. These observations have important implications for how obesity prevention and treatment services are designed and delivered in the county and should therefore inform the targeting of service provision and accessibility considerations. **Forest of Dean and Tewkesbury Districts** have significantly higher rates of excess weight in adults compared with the England average. Gloucestershire GP registers showed there were 46,306 people aged 16 years and over who were obese in 2014/15. Almost half (48%) of the 27 practices with significantly high obesity rates, are in **Gloucester locality**, 26% in **Forest locality** and 11% in **Tewkesbury.** These localities may as a matter of priority, may wish to assure themselves of the **accessibility and adequacy of the provision of prevention and management interventions for obesity** in their localities.*
- *There are a number of services/interventions available to help maintain a healthy weight in CYP and adults across the county. Work is currently underway in terms of reviewing interventions and services available to adults across the county under the auspices of the Health and Wellbeing Board's Obesity delivery card. This work aims to ensure that current services are optimal in terms of their ability to meet the need of residents. '**Slimming World'** a Tier 2 services for adults in the county has enjoyed **significant success** in terms of weight loss in adults referred. **Access rates** across the localities would benefit from exploration to ensure that there is **optimal access** to this service in the **areas with higher need**. The service should also explore improved **targeting** of the service to **population groups with a higher risk** profile. There are an estimated 3,921 adults who can benefit from Tier 3 services and are currently in contact with GP services. The county however currently has 400 patients per year in Tier 3 services. It is therefore recommended that the **ongoing review of adult weight management services** specifically explore **optimal access to Tier 3 services**. Gloucestershire patients are able to access Tier 4 service from GHNHST, North Bristol NHS Trust of Musgrove Park Hospital Taunton, depending on BMI/complexity. There is an imperative to continue to*

address childhood obesity *in the county, especially in light of excess weight in 4 to 5 year olds in the county which is significantly higher than national rate, especially in* ***our areas of higher deprivation****. Childhood obesity is a recognised* ***risk factor for developing Type 2 Diabetes as an adult.*** *There is recognition in the county of many gaps in the provision of weight management interventions and* ***services for children*** *across the various tiers of provision and there is ongoing work to start to address this.*

- *Type 2 Diabetes is up to six times more common in south Asian communities than in the general UK population, and it's three times more common among people of African and African-Caribbean origin. The National Diabetes Audit showed that that only 4% of Gloucestershire adults with Type 2 Diabetes are from minority ethnic groups compared to 19% nationally in 2014/15. This needs to be interpreted with great caution especially as more than a third of adults had 'unknown' ethnicity (compared with about 18% nationally), some of who could be from the BME group. The* ***recording of ethnicity*** *should be an area of focus for the future.*
- ***Deprivation*** *is strongly associated with higher levels of* ***obesity, physical inactivity, unhealthy diet, smoking and poor blood pressure control,*** *which are in turn linked to the risk of* ***developing Type 2 Diabetes*** *and the risk of* ***serious complications*** *amongst those* ***already diagnosed with both Type 1 and Type 2 Diabetes***

Prevention of Diabetes

- ***Type 1 Diabetes cannot be prevented*** *but there is however a lot of evidence that lifestyle changes can help prevent the development of Type 2 Diabetes.* ***Avoidance of obesity*** *is the* ***major target of primary prevention of Type 2 Diabetes****, with this being achieved mainly through increased exercise or restricted calorie intake. Relevant healthy lifestyle messages and interventions should be targeted at people at high risk i.e. those who are* ***aged 40 and above,*** *those who have a* ***family history*** *of the disease, those with* ***low levels of physical activity*** *and those who are* ***overweight****. These groups should be considered for prioritisation within the re-procured lifestyle service in the county.* ***Secondary Prevention*** *should focus on the earliest possible identification of the Type 2 Diabetes (e.g. borderline elevations of blood glucose or other markers of risk), with a view to delivering* ***early evidence-based interventions****.* ***Tertiary prevention*** *is concerned with the* ***early identification and treatment/management of complications*** *of diabetes to reduce the morbidity and mortality associated with these.*
- *Many people destined to develop* ***Type 2 Diabetes*** *spend many years in a state of* ***prediabetes*** *which a situation where a person's blood glucose levels are higher than normal but not high enough for a diagnosis of Type 2 Diabetes Mellitus. PHE estimates the prevalence of* ***prediabetes in Gloucestershire*** *to be 11.7% i.e.* ***59,111 people*** *aged 16 years and over – the cohort of people to be targeted should Gloucestershire succeed in its bid to run the* ***NHS Diabetes Prevention Programme – Healthier You****. Those referred to the programme will get tailored, personalised help to* ***reduce their risk of Type 2 Diabetes*** *including education on healthy eating and lifestyle, help to lose weight and bespoke physical exercise programmes, all of which together have been proven to reduce the risk of developing the disease. There are a number of steps the county needs to take in readiness for*

*this and the **CPG would need to take ownership** of these issues and ensure they are progressed appropriately and in a timely manner.*

- *The **NHS Health Check** is expected to amongst other things, help prevent 4,000 people from developing Type 2 Diabetes and detect at least 20,000 cases of Type 2 Diabetes or kidney disease earlier, nationally. The service which is commissioned by Gloucestershire County Council is expected to serve as one **source of referral for the NHS Diabetes Prevention Programme.** Gloucestershire performs significantly better than regional and national averages in offering Health Checks, but significantly **worse** in terms of the eligible population actually **receiving the checks**. It would be helpful to have a good understanding of what might be the **barriers** to invited people taking up their invitations, as more concerted efforts need to be deployed at completing these checks if this service is to serve as a veritable source of case finding for the NHS DPP locally. Improved take-up of NHS Health Checks could lead to people at high risk of Type 2 diabetes (in the eligible group) getting the support for intensive lifestyle behaviour change that can help prevent it even in the absence of NHS DPP.*

Services and Care for Diabetes

- ***Diabetes care** should include all the **eight NICE recommended annual care processes** with patients (and carers) also attending a **structured education programme** when diagnosed. The **ninth** one is delivered by the NHS Diabetes Eye Screening Service.*
- *Service delivery for Diabetes in Gloucestershire care cover primary care (including general Diabetic care and a community enhanced service), Community Diabetes Specialist Service supporting the management of Type 2 Diabetes (including provision of structured education), secondary care (including outpatient and inpatient services for adults and children)*
- *The **Community Enhanced Service** (CES) is available at two levels to all GP practices in the county with the aim of **improving knowledge and skills, reducing variation in quality of care, minimise referrals and repatriate stable** non-complex patients from secondary care. It is hoped that this CES would also lead to **reduction in outpatient referrals and follow-up**. It is not clear how well this service is meeting these aims and this would need to be further explored with the Information team, especially given the **decrease in performance** in terms of **completion of the eight care processes** at a county level as well as the huge **unwarranted variation** across practices in this respect. It would also be good to explore the current performance of the seven Practices not signed up to the CES in particular against those signed up, to ensure the most effective use of the funds*
- *The **Community Diabetes Team** provides specialist support to primary care in the management of people with Type 2 Diabetes. The team also provide structured education programmes which have recently been restructured and now enjoy good engagement with patients. This **performance** however needs to be explored in terms of **measurable improvement** in the county's performance (including attendances given that referrals to such sessions in Gloucestershire have decreased in recent years, though still higher than national average around structured education. The CDT has also been **recently re-designated** to provide a fully primary-care facing and supporting services with specific objectives. It is recommended that the CPG continues to monitor and **evaluate** how well these objectives are being met.*

- *GHNHSFT provides secondary care for adults and CYP with Diabetes. Outpatient services include a general diabetic clinic, joint Diabetes/Renal clinic, antenatal clinic and Insulin Pump clinic. There is also a* ***Young Adult Clinic*** *which could benefit from exploration as to how well* ***transition*** *CQUIN if working for young people transiting to adult services especially around motivation to manage their condition which is core to a successful transition.* ***Specialist diabetes nursing provision*** *is below England average on both hospital sites, especially in CGH. This is of concern given that there is evidence that specialist diabetic inpatient teams can reduce* ***prescribing errors****, improve* ***patient outcomes****, reduce* ***length of stay*** *and reduce the* ***number of admissions****. Savings from introducing such teams are likely to substantially outweigh associated costs. There is no provision of Podiatrist Care (currently being* ***addressed) or specialist pharmacist care in either of the hospital. Specialist*** *pharmacist support can help with* ***prescribing errors*** *which seem to be an issue locally.*
- *The greatest proportion of people treated in hospital (4 in 10)had Type 2 Diabetes, and the proportion of inpatients with Type 2 (diet only) was higher in both hospitals than the England average, which might point to issues around* ***consistent and appropriate dietary support in the community.*** *Also, the proportion of inpatients with Type 2 (non-insulin) has moved from below national average to similar (unlike Type 2 insulin) suggesting there is scope to explore how well the CDT are able to support Type 2 patients in the community including what additional support they may need.*
- *The proportion of patients with Diabetes* ***admitted specifically for the management of Diabetes*** *has remained relatively stable nationally, decreased in GRH but* ***increased in CGH****. This pattern is worth* ***exploring*** *in terms of what the* ***underlying determinants*** *are. For patients admitted for the management of diabetes in CGH, 19.1% were admitted for active foot disease with this being just 1.6% in GRH in 2015 compared with 8.9% nationally. Despite this relatively high figure, only 10% received a foot check during their stay (34% nationally). The ongoing work on diabetic footcare should explore this further as well.*
- *The* ***proportion of inpatients*** *with Diabetes admitted to GRH in 2015 as an* ***emergenc****y was above national average and in the* ***highest quartile nationally****, with* ***GRH*** *generally having a* ***higher than average*** *proportion of admissions as emergencies over the years. An understanding of what constitutes these emergencies from the catchment areas would be necessary in order to reduce rates by providing* ***appropriate support outside hospital****, S&BV locality which has a lower prevalence of Diabetes has higher numbers of emergency admissions compared to Forest which has a higher than average prevalence.* ***Ketoacidosis*** *in patients with insulin-dependent Diabetes the reason for emergency admission in a* ***third*** *of cases followed by patients with non insulin dependent Diabetes without any complications (22% of admissions)and insulin dependent Diabetes without complications representing 19%*
- *There has been an i****ncrease*** *in recent years in* ***excess bed days*** *which has been found to be the* ***second highest source of cost*** *for diabetic care. This seems to be particular issue for Gloucester and Forest localities*
- ***Patients in GRH*** *seems to generally have a higher than national average rate of* ***hypoglycaemic episodes while on admission****. Though the trend is in a downward direction, more concerted efforts are needed to bring this below national average, especially as hypoglycaemic episodes are* ***avoidable*** *and should be a rare occurrence in a hospital setting. The use of* ***insulin infusion*** *was found to be* ***inappropriate in about 43%*** *of patients in GRH in 2015 which might have been responsible for the higher than average rate of severe*

*hypoglycaemia. This needs to be **further explored** given the magnitude as well as its occurrence following a number of years of appropriate use in previous years. **Medication errors, prescription errors and insulin errors** were all found to be higher in **both hospitals** (in the highest quartile) than the England average. Performances in these areas have been largely in the highest quartile over the years and would therefore benefit from further exploration.*

- *The **county does well** with all **care processes for CYP except for eye screening** which was below regional and national averages. The Diabetic Eye screening service needs to find more innovative ways of improving uptake in CYP and the **CPG should keep a close eye** on **performance** in this area. 58% of CYP with Diabetes received structured education compared with a regional average of 38.8% and a national average of 57.4%. In line with NICE Quality Standard which recommend intensive insulin therapy, about a third of Gloucestershire' s CYP with Type 1 Diabetes is managed with Insulin Pump therapy compared with regional and national averages of 19.5% and 22.9% respectively*
- *The **main complications driving the cost of Diabetes** in the NHS nationally are **heart disease** (Myocardial Infarction, Coronary Heart Disease, Heart failure and other CVD), **kidney failure** and other renal costs**, Neuropathy**, **Stroke and foot ulcers/amputations**. People of **south Asian and African-Caribbean** origin have an increased risk of developing complications of diabetes, such as heart disease, at a **younger age** than the rest of the population. These groups of people will benefit from **targeted interventions** around **optimally managing** their Diabetes. The **additional risk of angina** in people with Diabetes was 158.4% which was **significantly worse** than the England average of 136.8%, just like the **additional risk of minor amputations** while that of renal replacement therapy was better. The diabetic foot implies for diabetics the highest number of hospital admissions and as well as considerable costs. 19.1% of patients with Diabetes in CGH were **admitted with active foot disease** compared with 8.9 nationally putting **CGH in the highest quartile nationally**, the proportion having increased in recent years. Only 10.6% of diabetics however received a **foot risk assessment** within 24 hours of their admission, and 10.6% at some point during their hospital stay. This compares with a England average of 28.7% and 34% respectively, putting CGH in the lowest quartile. In GRH, only 1.6% of patients with Diabetes were admitted with active foot disease (the proportion having decreased over the years) putting this at the lowest quartile nationally. The **differences in both sites** needs further exploration within the ongoing work on diabetic footcare to ensure **equity of provision of high quality supporting community and primary care services.** The risk of foot problems is increased largely because of either **diabetic neuropathy** or **peripheral arterial disease**. Chronic painful neuropathy is the most common type of neuropathy (with up to about 9,795 diabetics affected in Gloucestershire), but Neuropathy may also be completely painless. Many patients may not understand the **significance of neuropathy** and associated risks as they expected pain to be an indicator of a problem. It is therefore worth ensuring that this is **emphasised** as part of the general and **structured education** provided to patients and carers in the county. There has been a **downward trend in foot examination and risk classification** in patients with Diabetes both at a national and a local level. The rate of fall nationally seems to be slowing which is not yet apparent in Gloucestershire. There is therefore a **need to reverse this**. Also, maintaining an optimal level of glucose and triglycerides would help in reducing the incidence and prevalence of diabetic neuropathy. **Peripheral arterial disease** (PAD) is*

increased by age, duration of diabetes, and presence of peripheral neuropathy. ***Cigarette smoking is the single most important modifiable risk factor*** *for the development and exacerbation of PAD. The level of provision of* ***smoking cessation*** *support and treatment for pertinent conditions (including PAD) in the county has unfortunately stalled and is now lower than the England average.* ***Additional support*** *would need to be provided to those* ***Practices performing significantly below average.*** *Diabetes is the leading cause of preventable sight loss in people of working age in the UK. All GP localities have an average* ***retinopathy screening uptake*** *that is at least equal to the national target of 70% except for* ***Gloucester Locality*** *which can benefit from some* ***targeted action*** *from the Eye Screening Service. Gloucestershire also needs to perform much better at* ***screening CYP*** *and the Diabetic Eye Screening Service should be challenged to improve on this through more innovative means of engaging CYP and their families in the screening process.*

- *The risk of* ***small blood vessel (microvascular) disease*** *like chronic kidney diseases and eye disease in CY increases with age and with* ***deprivation*** *with the presence of micro or macroalbuminuria found to be higher in the South West (13.6%) compared with the England average (11.6%).* ***Abnormal eye screening*** *increases with* ***age*** *in young people with 14.5% of young people in the South West found to have abnormal findings compared with the England average of 13%. The risk factors for* ***large blood vessel (macrovascular) disease*** *include high blood pressure, abnormal blood lipids, high body mass index and smoking. The* ***adverse effects of smoking are strongest in CYP with Type 1 Diabetes patients****. Though doing relatively well, there is scope for improvement in the management of blood pressure in CYP with Diabetes in Gloucestershire.*
- *For* ***treatment targets****,* ***Gloucestershire*** *performs much* ***better than its peers*** *in terms of control of* ***blood sugar****, while it is similar to peers for blood pressure and cholesterol control. These performances however* ***vary greatly across GP Practices****. Meeting HbA1c targets reduces the risk of all diabetic complications, which makes our performance around this of particular importance. People with Type 1 Diabetes are much less likely to receive the HbA1c check – only 84% – compared with 95% of people with Type 2 and other Diabetes. People with Type 1 Diabetes are much less likely to reach recommended targets than people with Type 2 Diabetes (31% versus 67% nationally)* ***Blood glucose control remains high risk*** *in most people with Type 1 Diabetes and in* ***all younger people with Diabetes****. Gloucestershire was able to achieve HbA1c level of <=59mmol/mol in 63.7% of patients with Diabetes in 2014/15 with this ranging from 49.4% to 76%. 21 GP practise performed significantly better than England average with just 2 practices performing worse.* ***We would need to understand*** *better how our performance compares across the two types of Diabetes.* ***Gloucestershire*** *seems to* ***perform*** *comparatively* ***better*** *in terms of* ***intensive insulin therapy in CYP with Type 1 Diabetes.*** *Though comparatively fewer proportions of CYP with Type 1 Diabetes in Gloucestershire have undesirably higher HbA1c levels, we could perhaps improve on maintenance of a near normal blood glucose level to reduce the risk of long-term complications and improve quality of life. The 2014/15 National Paediatric Audit found that better control was achieved in the first year following diagnosis compared to the longer term. It also found that CYP living in the* ***most deprived*** *areas had worse outcomes in terms of HbA1c. Furthermore, insulin pump usage was found to be greater in younger age groups and in the least deprived areas. It is recommended that we review outcomes in CYP to see if we need to further target these specific cohorts of CYP.*

Stakeholder Views

- *Overall, feedback suggests local Diabetic services that are assessed as good or very good by stakeholders. A number of views are however worthy of further consideration:*
    - *Ability of Diabetes team to talk appropriately to CYP in order to optimally engage them*
    - *Focusing on solutions in terms of disease management for CYP instead of previous difficulties*
    - *Providing more opportunities for CYP to give feedback on clinic experiences and suggestions for improvement*
    - *Involvement of inpatients in the planning of their treatment*
    - *Choice and timing of meals for inpatients*
    - *Knowledge of Diabetes by staff*
    - *GP practices and preconception care*
    - *Availability of specialist Diabetes nurses*
    - *The need for GPwSI*
    - *Availability of support groups for Type 1 Diabetes*
    - *Healthy eating and cooking lessons*
    - *Access to psychology support*
    - *Staff training in motivational interviewing*

****A more detailed report which provides the results of engagement with local patients and clinicians is available separately.*

Evidence

****A separate report on evidence and best practice is available*

Gaps in Service Provision

- *Gloucestershire has a comprehensive service provision for people with Diabetes across the county, going from community to primary, secondary and specialist care. There are also a number of support groups available. The relative lack of support for people with Type 1 Diabetes in the community has been highlighted.*
- *An acknowledgement has been made of the gaps in the county around interventions for overweight/obese children and this is being addressed. Additional support may however be needed for the prevention, management and self –care of Diabetes in people from deprived areas.*
- *Adequacy of psychological support for specific high risk groups/cohort, and CYP would need to be explored, as well as optimal dietary support in the community and optimal access to Tier 3 obesity services in the county.*

Priorities for Implementation

These would include:

- *Comprehensive and accessible obesity prevention and management services for CYP and adults*

- *Implementation of NHS DPP*
- *Demonstrable optimal management of Diabetes across primary, secondary and specialist*
- *Early and appropriate management of complications*
- *Enhancing the potential for self-care to support management of the conditions and complications*

Recommendations

- *Access, available support and outcomes in Gloucestershire patients with Type 2 Diabetes should be explored in specific groups (e.g. socially excluded groups, people with LD and mental Health problems), as well as for patients in Gloucester and Forest Localities*
- *There is a need to focus on prevention of Type 2 Diabetes in CYP targeting those from south Asian and Black communities especially in terms of appropriate ac cess to management of childhood obesity*
- *A review of the management of CYP with Type 2 would be beneficial especially in terms of optimal treatment and education*
- *Explore how well complications are being prevented with a view to potential provision of appropriate support to primary care and patients around education and optimal management*
- *Target care homes particularly those for Elderly Mentally Infirm with Diabetes education ans support*
- *Explore how our spend is distributed across emergency transport and community and integrated care to ensure optimal utilisation of available funds*
- *Explore how to further improve spend per person item on insulin*
- *Explore how optimal the provision of psychological support to improve outcomes is, especially in patients with Type 2 Diabetes undergoing treatment intensification and Type 1 with very intensive treatment, demanding self-care and increased hypoglycaemia. Also for women and people from lower socio-economic groups.*
- *Consider incorporating 'coping skills training' into education programmes to ensure enhanced wellbeing, optimal self-management and potential fewer complications.*
- *Review access of CYP to Mental health professionals with an understanding of Diabetes to ensure that this is optimal*
- *A focus on prevention of obesity is necessary considering its central role as risk factor for Type 2 Diabetes, with potential targeting of groups at higher risk, as well as Forest, Gloucester and Tewkesbury localities. Accessibility to interventions should also be explored.*
- *Access to 'Slimming World' should be explored to ensure this is optimal in areas and groups with higher need*
- *The recording of ethnicity needs to be promoted across all providers to enable a better understanding of relative need and outcomes across populations*
- *Consider prioritising people aged over 40, those with a family history of diabetes, low levels of physical activity and overweight people for accessing lifestyle services with a view to preventing Type 2 Diabetes.*
- *The CPG should take ownership of required steps the community needs to take in readiness for implementing the NHS DPP to ensure the steps are progressed appropriately*

- *Consider exploring what the barriers might be to the take up of NHS Health Checks in collaboration with GCC*
- *Explore how ell the CES is meeting its set objectives with a view to reviewing appropriately*
- *The performance of the CDT should be explored in terms of measurable outcomes as well as meeting set objectives.*
- *A review of how well the transition (including the CQUIN) is working for young people transiting to adult care*
- *Explore how specialist Diabetes nursing provision and specialist pharmacy support can be improved upon in terms of improved outcomes and reduction in prescribing errors*
- *The ongoing work on diabetes footcare should explore equity of provision versus need across CGH and GRH*
- *An understanding of needed support for patients presenting as emergencies especially in to GRH would be beneficial. Prevention of ketoacidosis may be an area of initial focus.*
- *Excess bed days should be explored in terms of ways of reducing this in order to make more effective use of funds, especially for Gloucester and Forest localities*
- *Hypoglycaemic episodes in hospital especially in GRH need further exploration. Also the use of insulin infusion, as well as medication, prescription and insulin errors.*
- *The Diabetic Eye Screening service needs more innovative ways to address uptake of retinopathy screening by CYP. The CPG should keep a close eye on their performance around this.*
- *Consider targeted support fro retinopathy screening in Gloucester locality*
- *Consider reviewing the emphasis placed on significance of neuropathy and its various presentation within structured education*
- *Explore if there is scope for improvement in the management of blood pressure in CYP with Diabetes*
- *There is a need for a better understanding of performance with the three control targets across the two types of Diabetes in GP Practices in general*
- *Additional support for smoking cessation may be needed especially in GP Practices that are not performing as well as peers*
- *A review of outcomes in CYP around HbA1c control may be beneficial to see fi we need to target improvements at CYP from more deprived areas as well as those of older age*
- *Gloucestershire may wish to consider the potential usefulness of having a GPwSI*

1. Background

This health care needs assessment has been requested to support the ongoing work of the Diabetes Mellitus Clinical Programme Group (CPG), especially in terms of identifying priorities following its re-launch.

The re-launch of the CPG is in recognition of the implications of the growing burden of diabetes mellitus nationally and locally, the importance of which has been specifically acknowledged in the NHS Planning Guidance[1] issued to support the delivery of the Five Year Forward View via local Sustainability and Transformation Plans (STPs). The 'national challenges' for STPs in terms of closing the Health and Wellbeing Gap includes:

- Local implementation of the National Diabetes Prevention Programme
- Actions to address obesity (including childhood obesity) - a key driver of the rising diabetes mellitus burden.

Whilst acknowledging the progress made by the Department of Health and NHS England in improving outcomes for diabetes patients, the Public Accounts Committee in its January 2016 report highlights the significant variations in the routine care and support that diabetes patients receive, and in outcomes for them[2]. Exploring what the situation is in Gloucestershire would help us in identifying our priorities going forwards.

Furthermore, the new Ofsted-style 'Improvement and Assessment Framework[3]' for CCGs has Diabetes as one of the six clinical priority conditions for assessing how local areas' health services are performing. Gloucestershire would want to be in a position where we are able to demonstrate an improvement in our performance in relation to Diabetes, particularly in the areas being assessed namely:

- The percentage of diabetes patients that have achieved all 3 of the NICE-recommended treatment targets
- Newly diagnosed diabetes patients referred to or attending a structured education course

The CPG currently has a number of work streams in train including the Diabetes Community Enhanced Service (CES) for Primary Care and the Diabetes Footcare Project which are currently addressing identified issues.

This needs assessment covers Diabetes Mellitus Type 1[4] and Type 2[5] and looks as these disease types in children and adults. It does not cover secondary diabetes[6], Maturity Onset Diabetes of the Young (MODY)[7] or gestational diabetes[8].

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[1] https://www.england.nhs.uk/wp-content/uploads/2015/12/planning-guid-16-17-20-21.pdf
[2] House of Commons Committee of Public Accounts. http://www.publications.parliament.uk/pa/cm201516/cmselect/cmpubacc/563/563.pdf
[3] https://www.england.nhs.uk/commissioning/wp-content/uploads/sites/12/2016/03/ccg-iaf-mar16.pdf
[4] Type 1 Diabetes - the pancreas does not make insulin. Insulin is a hormone that helps glucose, or sugar, get into your cells to give them energy. Without insulin, too much sugar stays in the blood.
[5] Type 2 Diabetes - where the pancreas doesn't produce enough insulin or the body's cells don't react to insulin

A separate needs assessment which has been concluded for Diabetic Footcare to support the ongoing project on this gives more details about issues and priorities specific to diabetic footcare in the county.

2. Burden of Disease

Diabetes Mellitus is one of the most common chronic diseases in the UK and its prevalence is increasing (being particularly driven by Type 2 Diabetes).

Type 1 Diabetes is an autoimmune condition, a situation where the immune system mistakes pancreatic cells as harmful and attacks them, destroying them completely or damaging them enough to stop them producing insulin. The exact trigger of this reaction is not known though some researchers have suggested that it may be due to a viral infection. Type 1 Diabetes often runs in families, so the autoimmune reaction may also be genetic. People with a close relative (e.g. parent, brother or sister) with the condition have about a 6% chance of also developing the condition. The risk for people who don't have a close relative with Type 1 diabetes is just under 0.5%.

Type 2 Diabetes on the other hand is often associated with obesity and tends to be diagnosed in older people. It's far more common than Type 1 Diabetes.

The burden of Diabetes Mellitus can be explored in terms of its epidemiology, its impact on quality of life as well as its economic burden.

2.1. Epidemiology

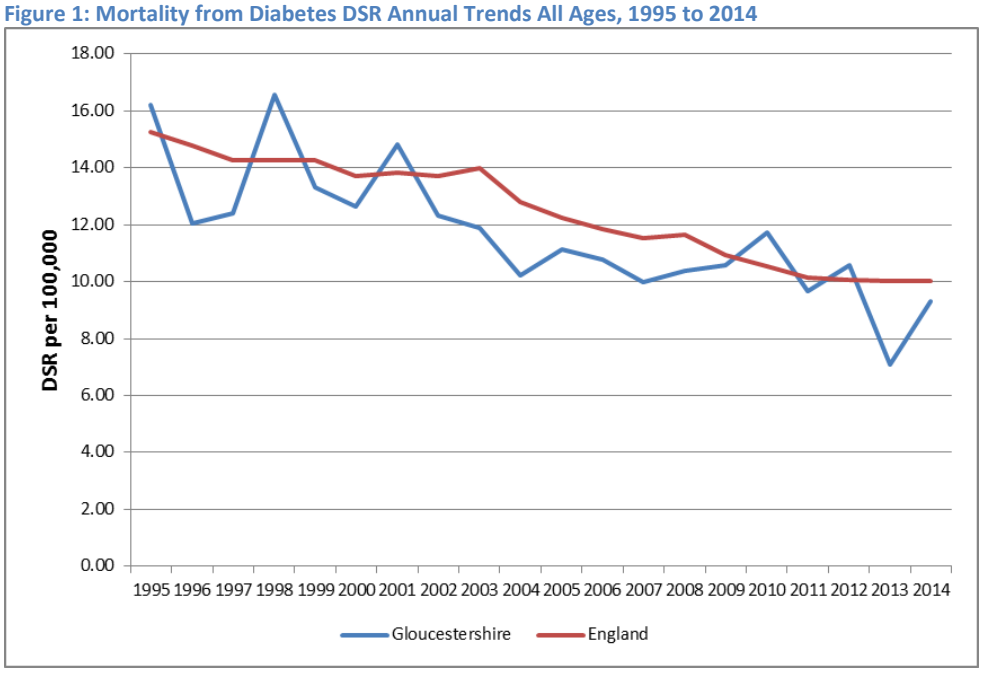
The death rate over the years from Diabetes in the county has been on the downward trend in line with the national experience (Figure 1). This is evident for both males and females.

[6] Diabetes that results as a consequence of another medical condition e.g. Cushing's syndrome

[7] This refers to any of several hereditary forms of diabetes caused by mutations in an autosomal dominant gene disrupting insulin production. MODY is often referred to as "monogenic diabetes" to distinguish it from the more common types of diabetes (especially type 1 and type 2), which involve more complex combinations of causes involving multiple genes (i.e., "polygenic") and environmental factors

[8] During pregnancy, some women have such high levels of blood glucose that their body is unable to produce enough insulin to absorb it all

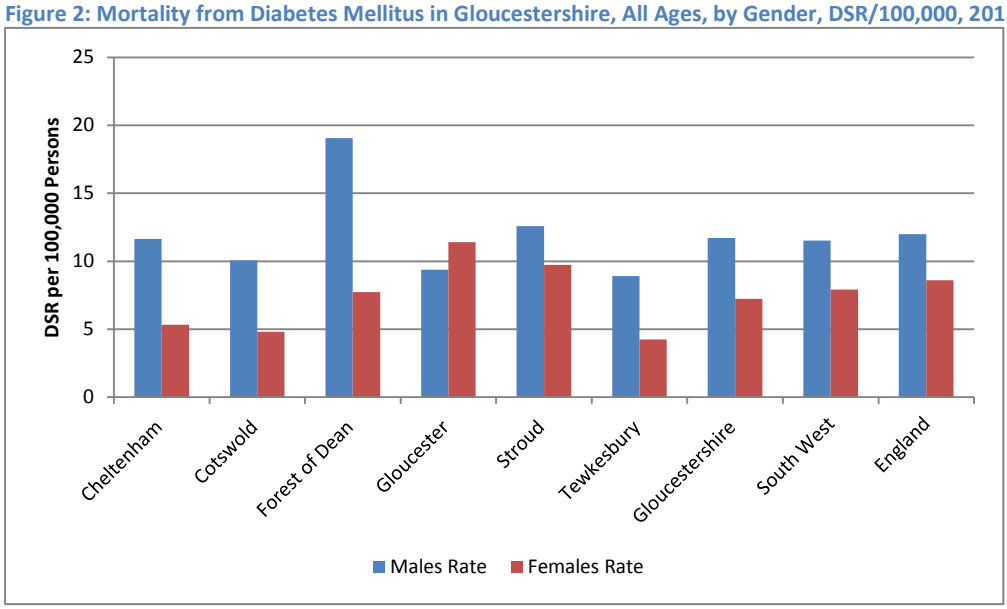
Figure 1: Mortality from Diabetes DSR Annual Trends All Ages, 1995 to 2014



Source: HSCIC Indicator Portal

The latest 3 year pooled data shows that the **death rate** in Gloucestershire is higher in males then in females in line with the national picture, except in Gloucester where the rate appears to be higher in females (Figure 2).

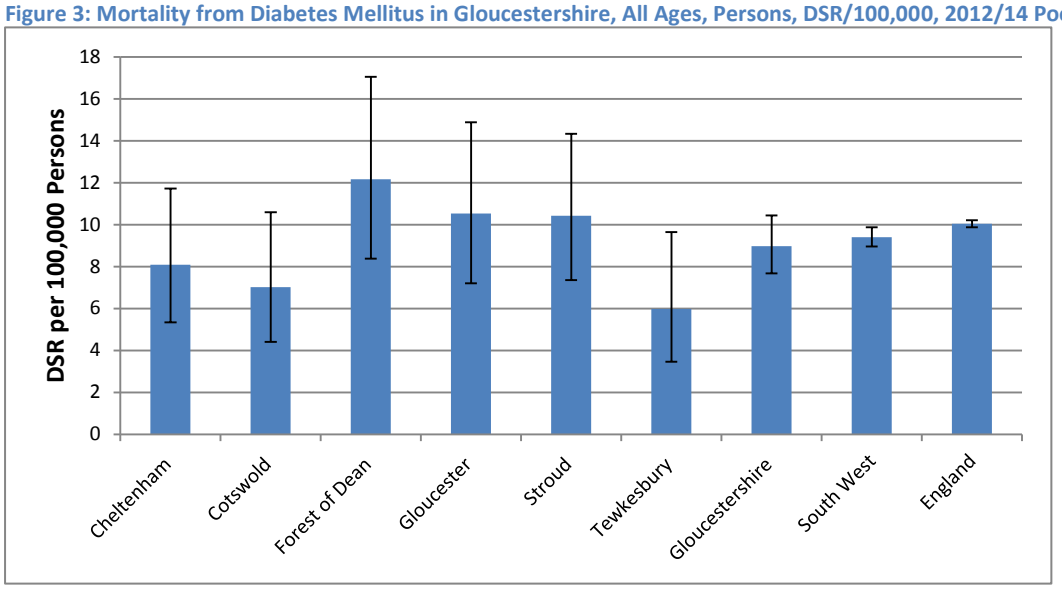
Figure 2: Mortality from Diabetes Mellitus in Gloucestershire, All Ages, by Gender, DSR/100,000, 2012/14 Pooled



Source: HSCIC Indicator Portal

In terms of significance, mortality in Gloucestershire is however not statistically significantly different from the national average, and the rates across the county are neither significantly different between individual districts nor to the county average (Figure 3).

Figure 3: Mortality from Diabetes Mellitus in Gloucestershire, All Ages, Persons, DSR/100,000, 2012/14 Pooled



Source: HSCIC Indicator Portal

2.1.1. Inequalities in Diabetes and its Outcomes

Significant inequalities exist in the risk of developing Diabetes, in access to health services and the quality of those services, and in health outcomes, particularly with regard to people with Type 2 diabetes. Those who are **overweight, physically inactive or have a family history of diabetes** are at increased risk of developing diabetes. People of **South Asian, African, and African-Caribbean** descent have a higher than average risk of developing Type 2 Diabetes, as do **less affluent** individuals and populations. **Socially excluded people**, including prisoners, refugees and asylum seekers, and people with learning difficulties or mental health problems may receive **poorer quality care.** These all have implications for how Diabetes preventive, treatment, care and support services are designed and commissioned in the county.

People of **Indian Asian descent** have a prevalence of **Type 2 Diabetes which is four times more prevalent than in the general population**[9]. It is also known that risks of cardiovascular disease in Indian Asians with diabetes are greater than that in Europeans, reflecting their overall greater predisposition to CVD[10,11]. Studies have however shown that risks of both foot ulceration and amputation are substantially lower (threefold and fourfold, respectively) in Indian Asians compared with Europeans in the UK[12,13] , with lower rates of peripheral neuropathy largely responsible for this, as well as differences in smoking and prevalence of peripheral arterial disease (PAD)[14].

9 McKeigue PM, Shah B, Marmot MG. Relation of central obesity and insulin resistance with high diabetes prevalence andcardiovascular risk in South Asians. Lancet 1991;337:382–386

10 Forouhi NG, Sattar N, Tillin T, McKeigue PM, Chaturvedi N. Do known risk factors explain the higher coronary heart disease mortality in South Asian compared with European men? Prospective follow-up of the Southall and Brent studies, UK. Diabetologia 2006;49:2580–2588

11 UKPDS Group. UK Prospective Diabetes Study 32: Ethnicity and cardiovascular disease. The incidence of myocardial infarction in white, South Asian, and Afro-Caribbean patients with type 2 diabetes. Diabetes Care 1998;21:1271–1277

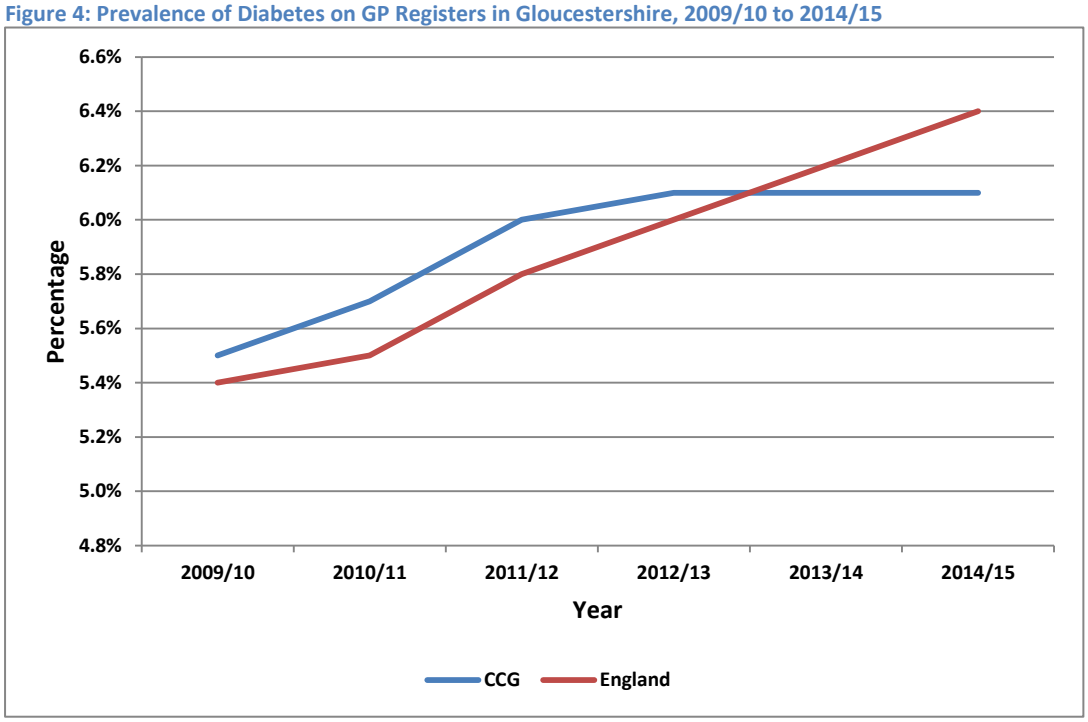
12 Abbott CA, Garrow AP, Carrington AL, Morris J, Van Ross ER, Boulton AJ. Foot ulcer risk is lower in South-Asian and African-Caribbean compared with European diabetic patients in the U.K.: the North-West Diabetes Foot Care Study.
Diabetes Care 2005;28:1869–1875

2.1.2. Diabetes Mellitus in Adults

The National GP Profiles[15] give estimates of people aged **17 years and over** with Diabetes seen in GP Practices. The **QoF prevalence** for this cohort was 6.4% nationally in 2014/15 and 6.1% in Gloucestershire (**having steadily increased** from 5.5% in 2009/10) equating to 31,547 people on the diabetes QoF registers in Gloucestershire in 2014/15.

Figure 4 suggests a plateauing in recent years of people on these registers compared to national trend, but this needs to be treated with some caution as QoF figures do not give the whole picture in terms of prevalence[16] as not all cases of Type 2 Diabetes in particular are diagnosed and known to GPs. Nonetheless, this represents an important source of information on people with Diabetes.

Figure 4: Prevalence of Diabetes on GP Registers in Gloucestershire, 2009/10 to 2014/15



Source: National GP Profiles http://fingertips.phe.org.uk/profile/general-practice

The QoF prevalence in 2014/15 varied across the county (from 2.35% to 9.56%) with some GP practices having rates that are significantly different from the England average (blue) detailed in Figure 5 below. Twenty-three GP practices had prevalence rates that were significantly lower than the England average (39% in Cheltenham Locality and 35% in Stroud and Berkeley Vale Locality).

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13 Chaturvedi N, Abbott CA, Whalley A, Widdows P, Leggetter SY, Boulton AJ. Risk of diabetes-related amputation in
South Asians vs. Europeans in the UK. Diabet Med 2002;19:99–104 cited in Jeffcoate, W.J.; van Houtum. (2004):Amputation as a marker of the quality of foot care in diabetes. Diabetologia (2004) 47:2051–2058 DOI 10.1007/s00125-004-1584-3

14 Leggetter S, Chaturvedi N, Fuller JH, Edmonds ME (2002) Ethnicity and risk of diabetes-related lower extremity amputation: a population-based, case-control study of African Caribbeans and Europeans in the United Kingdom. Arch Intern Med 162:73–78. Cited in Jeffcoate, W.J.; van Houtum. (2004):Amputation as a marker of the quality of foot care in diabetes. Diabetologia (2004) 47:2051–2058 DOI 10.1007/s00125-004-1584-3

[15] http://fingertips.phe.org.uk/profile/general-practice

[16] The proportion of individuals in a population having a disease or characteristic

Figure 5: Variation in Prevalence of Diabetes in People aged 17 years and above in Gloucestershire by GP practice, 2014/15

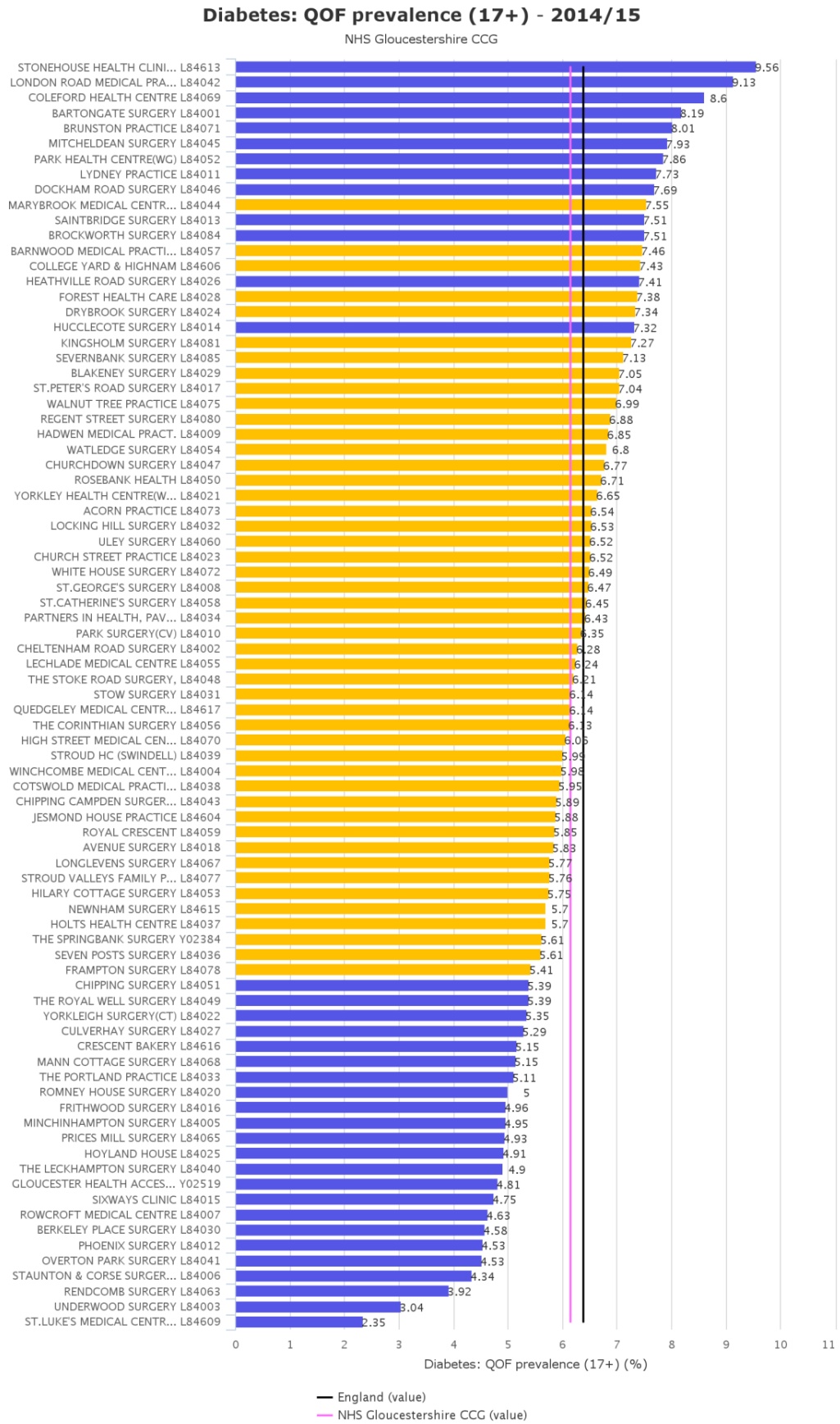


Table 1 shows that compared with the England average, the GP Practices with significantly high Diabetes prevalence are more or else evenly split between Gloucester and Forest Localities with one Practice in Stroud and Berkeley Vale Locality having the highest prevalence in the county.

Table 1: GP Practices with Diabetes Prevalence Significantly Higher than England Average, 2014/15

	GP Practice	Locality	Prevalence (%)
1.	Stonehouse Health Centre	Stroud & Berkeley Vale	9.56
2.	London Road Medical Practice	Gloucester	9.13
3.	Coleford Health Centre	Forest	8.6
4.	Bartongate Surgery	Gloucester	8.19
5.	Brunston Practice	Forest	8.01
6.	Mitcheldean Surgery	Forest	7.93
7.	Park Health Centre	Gloucester	7.86
8.	Lydney Practice	Forest	7.73
9.	Dockham Road	Forest	7.69
10.	Saintbridge Surgery	Gloucester	7.51
11.	Brockworth Surgery	Gloucester	7.51
12.	Heathville Road Surgery	Gloucester	7.41
13.	Hucclecote	Gloucester	7.32
14.	**England**	-	**6.4**

Source: Adapted from National GP Profiles http://fingertips.phe.org.uk/profile/general-practice

When compared with the Gloucestershire average, Forest of Dean and Gloucester Localities have **significantly higher** QoF prevalence of Diabetes Mellitus (Table 2). This would suggest that the need for services is higher in these parts of the county compared with the rest. North Cotswold and Tewkesbury localities have similar prevalence while Cheltenham, South Cotswold and Stroud and Berkeley Vale have significantly lower prevalence rates than the county average.

Table 2: QoF Prevalence Rates for Diabetes Mellitus (17+) in Gloucestershire by GP Locality, 2014/15

	CCG	Cheltenham	Forest of Dean	Gloucester City	North Cotswold	South Cotswold	Stroud & Berkeley Vale	Tewkesbury
2014/15	6.13%	5.29%	7.49%	7.01%	5.96%	5.53%	5.72%	5.94%

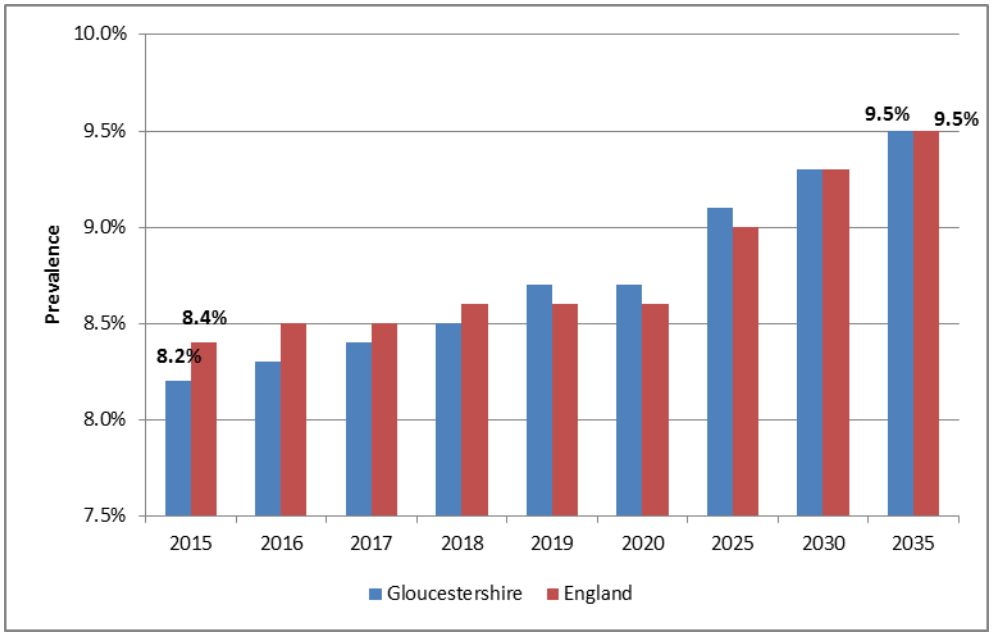
Significantly lower
Similar
Significantly higher

Source: Strategic Needs Analysis Team, Gloucestershire County Council

These variations in prevalence rates at practice and locality levels need to be taken into consideration when planning the design, commissioning, delivery and evaluation of services.

Not everyone with Diabetes (especially Type 2) is however currently diagnosed and therefore registered on Diabetes Registers. It is estimated that the prevalence in England of **diagnosed and undiagnosed Diabetes** in people aged **16 years and older** was 7.6% in 2015. The 'real' prevalence in **Gloucestershire CCG** was estimated at 8.2% (Figure 6) translating into a total **of 43,015 people aged 16 years and over**[17].

Figure 6: Estimated Total (Diagnosed and Undiagnosed) Diabetes Prevalence in Adults (16+), by CCG Registered Population, 2015-2035



Source: YHPHO. Diabetes Prevalence Estimates by CCGs: Registered Population.
http://www.yhpho.org.uk/resource/view.aspx?RID=154049

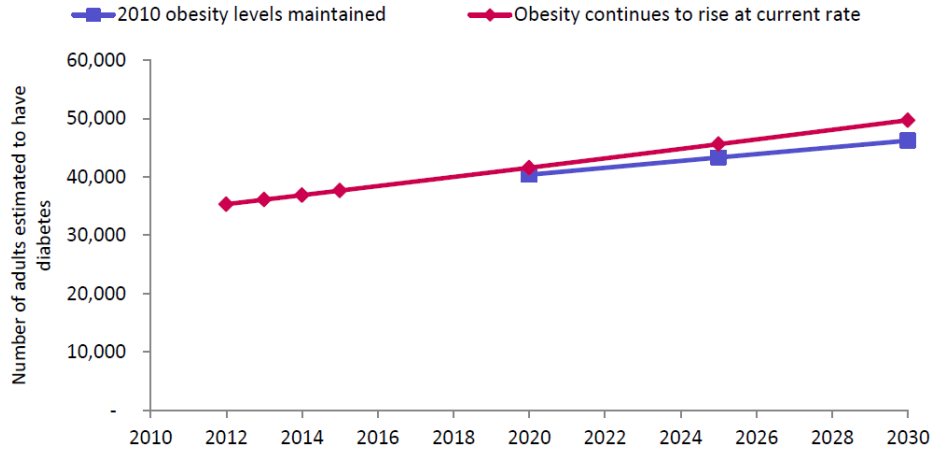
Type 2 Diabetes has obesity as its most potent risk factor accounting for 80– 85% of the overall risk of developing this type of diabetes. This underscores the importance of preventing and treating obesity in terms of reducing the risk of developing diabetes. Diabetes UK estimates that if current trends persist, one in three people will be obese by 2034 and one in ten will develop Type 2 Diabetes[18]. If current trends in population change and obesity in Gloucestershire persist, the total prevalence (diagnosed and undiagnosed) of Diabetes is expected to rise to 9.5%by 2035 – becoming similar to the national average (Figure 6) Though the driving factor underlying this might be more related to the population change trend (with more older people) rather than the obesity trend given our local demographic changes, addressing obesity would help mitigate this rise.

[17] PHE. Diabetes Prevalence Estimates by CCGs: Registered Population. Prevalence estimates of diabetes by clinical commissioning groups (CCGs) and England..
http://www.yhpho.org.uk/resource/view.aspx?RID=154049

[18] Diabetes UK, 2016. State of the Nation 2016. Time to take control of Diabetes.
https://www.diabetes.org.uk/Documents/Position%20statements/Diabetes%20UK%20State%20of%20the%20Nation%202016.pdf?utm_source=The%20King%27s%20Fund%20newsletters&utm_medium=email&utm_campaign=7328523_HMP%202016-07-19&dm_i=21A8,4D2Q3,FLWT89,G0Q9I,1

Figure 7 shows the trend in the prevalence of Diabetes in adults if the 2010 level of Obesity is maintained in Gloucestershire. As the demographic changes are less liable to modifications, the level of obesity becomes even more important as a modifiable factor. The trend in obesity in Gloucestershire is explored in more detail in section 3.2.2.

Figure 7: Estimated Impact of an Increasing Prevalence of Obesity on Diabetes Prevalence in Gloucestershire



Source: YHPHO. Diabetes Prevalence in Gloucestershire CC. http://www.yhpho.org.uk/diabetesprevtable/default.aspx

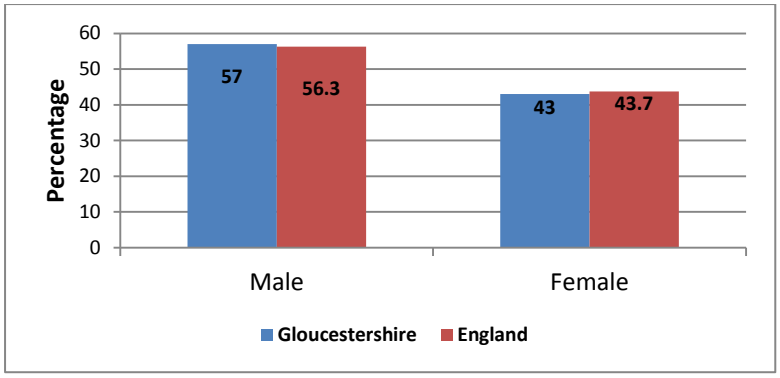
2.1.2.1. Type 1 Diabetes

The symptoms of Type 1 Diabetes usually arise and progress rapidly over the course of weeks or a few months, so most cases of Type 1 Diabetes are quickly diagnosed. The condition accounts for about 10 per cent of all adults with diabetes[19]. This translates into an estimated total in Gloucestershire of about 3,155 people aged 17+ that are diagnosed with diabetes. The National Diabetes Audit 2014/15 reported on 2,153 people at CCG level and 819 at GHNHSFT level with Type 1 Diabetes.

If this condition is not detected and managed early, there can be resultant disability such blindness, kidney failure and foot ulceration leading to amputation, as well as premature heart disease, stroke and death. Treatment aimed at keeping circulating blood glucose levels to as near normal as possible greatly reduces the risk of these complications by reducing tissue damage. For such complications that can not be avoided, early detection and active management is key to avoiding/reducing subsequent disability. With the diagnosis of Type 1 Diabetes being made in hospital rather than in primary care, structured education which helps patients understand their condition and its appropriate management is also provided in hospital.
Figure 8 shows that the gender distribution in Gloucestershire is similar to the England average with more males than females suffering from this condition.

Figure 8: Adults with Type 1 Diabetes in Gloucestershire by Gender, 2014/15

[19] Diabetes UK

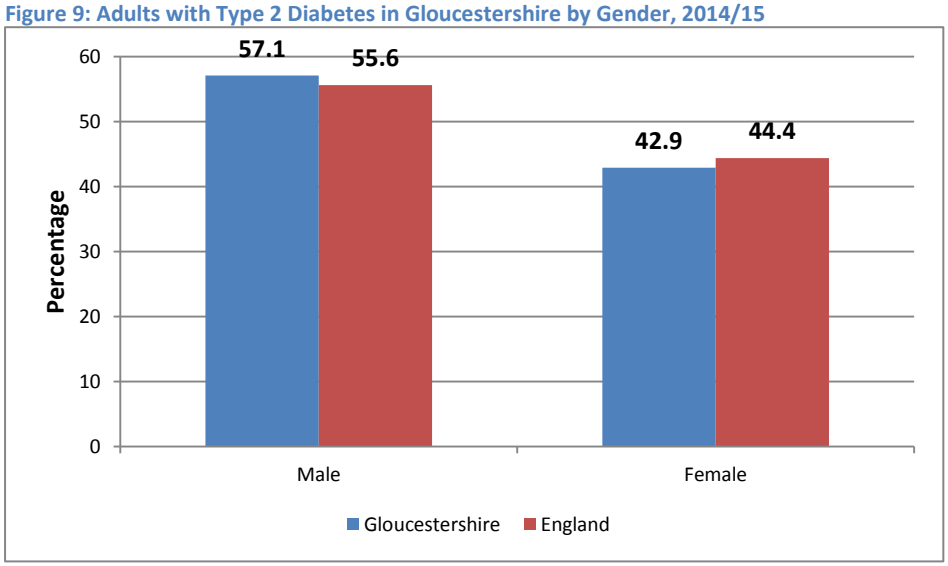


Source: National Diabetes Audit

2.1.2.2. Type 2 Diabetes

90% of adults with diabetes have Type 2 diabetes, which translates into an estimated total of 33,890 people aged 16 and over in Gloucestershire with this condition (diagnosed and undiagnosed), and about 28,392 aged 17+ that are diagnosed. Figure 9 which shows the gender distribution suggests that Gloucestershire has slightly fewer females with the condition compared with the England average.

Figure 9: Adults with Type 2 Diabetes in Gloucestershire by Gender, 2014/15



Source: National Diabetes Audit

2.1.3. Diabetes Mellitus in Children and Young People

2.1.3.1. Type 1 Diabetes Mellitus

Type 1 Diabetes usually appears before the age of 40, and it is the most common type of diabetes found in childhood. The 2014/15 National Paediatric Diabetic Audit showed that over 95% of children and young people (up to 24 years) in England and Wales had Type 1 Diabetes. It is estimated that less than 10% of all people with Type 1 Diabetes Mellitus and less than 1% with diabetes in general are under 17 years of age.

NICE reckons that Type 1 Diabetes is becoming more common in CYP in the UK[20]. The fact that the symptoms of this condition usually develop very quickly in young people (over a few days or weeks) underscores the recommendation in the new NICE Quality Standard which advices that a child or young person suspected of having diabetes should be immediately be sent to hospital and seen the same day by a multidisciplinary paediatric diabetes team[21].

The prevalence in 2014/15 of Type 1 Diabetes in children and young people (CYP) in England and Wales aged 0 to 15 years was estimated at 192/100,000 of the general population[22], higher for males (at 194.9) than females (187.2). This translates into an estimated total of 185 CYP[23] aged up to 15 years, with Type 1 Diabetes in Gloucestershire in 2014/15. The incidence was estimated at 26.5/100,000 nationally (higher in males at 28 than females at 24.4/100,000).

The 2014/15 National Paediatric Diabetic Audit which covered a total of 283 CYP (aged up t0 24 years) with diabetes receiving treatment in Cheltenham General and Gloucestershire Royal Hospitals found that 98.2% of them had Type 1 Diabetes. This was higher than the South West (96.5%) and England and Wales (95.5%) rates. This rate was also higher than national average in 2011/12 but not in 2010/11

2.1.3.2. Type 2 Diabetes Mellitus

Though less common than Type 1, the prevalence of Type 2 Diabetes Mellitus in CYP in the UK appears to be increasing with the incidence among ethnic minorities (South Asians and Blacks) much higher than in whites. NICE reckons that since 2004, this condition is being diagnosed with increasing frequency[24]. Increased adiposity and family history of Type 2 diabetes are strongly associated with its diagnosis in UK children[25]. This underscores the importance of preventing and managing overweight and obesity in our children, particularly within our south Asian and Black communities. Education about the increased risk in other family members of those who currently have the disease is also of utmost importance

It has been suggested that there is an accelerated risk of complication such as nephropathy[26, 27] and retinopathy[28] in CYP with Type 2 Diabetes Mellitus, as well as early signs of cardiovascular disease[29].

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[20] National Institute of Health and Care Excellence. Diabetes in children and young people. Quality Standard. 14 July 2016

[21] National Institute of Health and Care Excellence. Diabetes in children and young people. Quality Standard. 14 July 2016.

[22] Healthcare Quality Improvement Partnership, Royal College of Paediatrics and Child Health. National Paediatric Diabetes Audit Report 2014/15. Part 1: Care Processes and Outcomes. May 2016.

[23] Based on the ONS mid-2015 resident population estimates

[24] National Institute of Health and Care Excellence. Diabetes in children and young people. Quality Standard. 14 July 2016

[25] Haines, L. et al. Rising incidence of Type 2 diabetes in children in the UK ***Diabetes Care* 30:1097–1101, 2007**

[26] Svensson M, Sundkvist G, Arnqvist HJ,Bjork E, Blohme G, Bolinder J, Henricsson M, Nystrom L, Torffvit O, Waernbaum I, Ostman J, Erikkson JW: Signs of nephropathy may occur early in young adults with diabetes despite modern diabetes management: results from the nationwide population-based Diabetes Incidence Study in Sweden (DISS). Diabetes Care 26:2903–2909, 2003

[27] Yokoyama H, Okudaira M, Otani T, Sato A, Miura J, Takaike H, Yamada H, Muto K, Uchigata Y, Ohashi Y, Iwamoto Y: Higher incidence of diabetic nephropathy in type 2 than in type 1 diabetes in early onset diabetes in Japan. Kidney Int 58:302–311, 2000

[28] Yoshida Y, Hagura R, Hara Y, Sugasawa G, Akanuma Y: Risk factors for the development of diabetic retinopathy in Japanese type 2 diabetic patients. *Diabetes Res Clin Pract* 51:195–203, 2001

[29] Gungor N, Thompson T, Sutton-Tyrrell K, Janosky J, Arslanian S: Early signs of cardiovascular disease in youth with obesity and type 2 diabetes. Diabetes Care 28:1219–1221, 2005

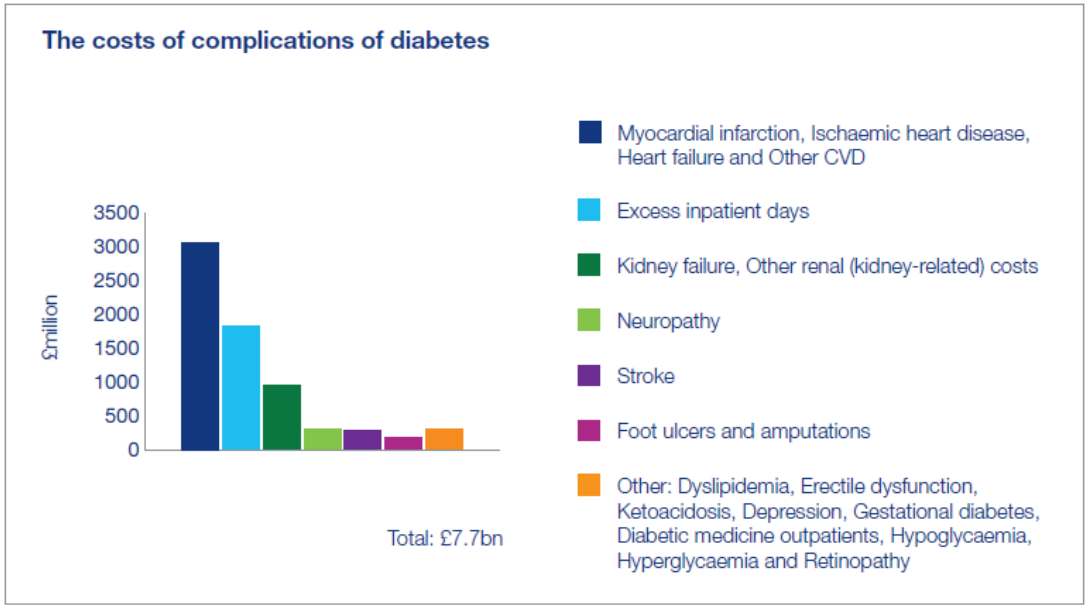
Close monitoring and secondary prevention therefore becomes extremely important in this cohort as well.

2.2. Economic Burden

2.2.1. NHS Costs

Diabetes mellitus costs the NHS in the UK £9.8 billion each year (about 10% of the NHS Budget) - £1 billion for Type 1 and £8.8 billion for Type2. 80% of this cost (£7.7 billion) has been attributed to diabetic complications especially heart disease, excess inpatient stay and kidney disease (Figure 10).

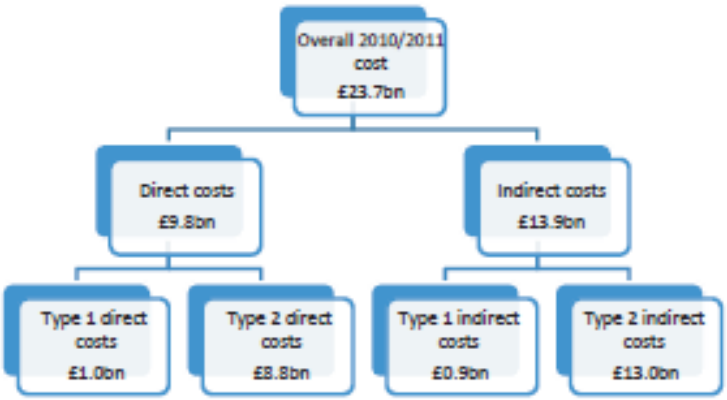
Figure 10: The Cost of Complications of Diabetes



Source: Diabetes UK: The cost of diabetes report.
https://www.diabetes.org.uk/Documents/Diabetes%20UK%20Cost%20of%20Diabetes%20Report.pdf

There are in addition, indirect costs which have been estimated at £13.9 billion - £0.9 billion for Type 1 and £13 billion for Type 2[30](Figure 11).

Figure 11: Breakdown of Direct and Indirect Costs of Diabetes in the UK, 2010/11



[30] Hex, N et al (2012). Estimating current and future costs of Type 1 and Type 2 Diabetes in the UK. Diabet Med. 2012 Jul;29(7):855-62

Source: Hex, N et al (2012). Estimating current and future costs of Type 1 and Type 2 Diabetes in the UK. Diabet Med. 2012 Jul;29(7):855-62

These costings which were carried out by York Health Economics Consortium were revisited by the Department of Health in 2015 in order to provide an estimate to cover England only and to cover only those costs that specifically related to, or were indirectly caused by, the condition (the consortium's estimate covered all costs incurred by patients who had diabetes). The Department estimated that the **cost of diabetes to the NHS in England** was £5.6 billion in 2010-11 (Table 3). It estimated that treatment costs for diabetes were £1.7 billion (31% of total costs) and that the cost of complications directly attributable to diabetes was £3.9 billion (69% of total costs). Appropriate management in order to prevent the development of complications is therefore an imperative.

Table 3: Department of Health's Estimate of the Cost of Diabetes to the NHS in England 2010/11

	Cost Element	Cost (£bn)
Treatment	Treatment and management	1.72
	Screening and testing	0.01
Complications	Cardiovascular disease	1.55
	Renal	0.79
	Foot ulcers and amputations	0.65
	Excess inpatient days	0.63
	Neuropathy	0.26
	Other	0.23
	Total*	**5.61**

*Note: Total does not sum due to rounding

Source: National Audit Office October 2015: The management of adult diabetes services in the NHS: progress review – National Audit analysis of Department of Health data

These costs are projected to get worse over the coming years if the current situation remains the same, especially if current care regimes remain the same in the face of demographic changes and rising obesity levels. This view was echoed by the Public Accounts Committee which advised the Department of Health and NHS in its January 2016 report, to take significant action to improve prevention and treatment for diabetes patients in the next couple of years in order to control costs. Gloucestershire would need to plan and work towards this as well.

2.2.2. Social Care Costs

Though social care costs are not included above, it is likely that costs related to this will not be inconsequential. Diabetes is known to double the risk of admission to a care home[31] and may account for up to one in four residents[32]. Residents with diabetes have an increased risk of disability[33], pressure sore development[34,] and hospital re-admission[35]. A study of diabetes

[31] Tsuji J, Whalen S, Finucane TE (1995). Predictors of nursing home placement in community-based long-term care. JAGS 43; 761-766 cited in 'Good clinical practice guidelines for care home residents with diabetes. A revision document prepared by a Task and Finish Group of Diabetes UK. January 2010

[32] Sinclair AJ, Gadsby R, Penfold S et al (2001). Prevalence of diabetes in care home residents. Diabetes Care 24 (6); 1066-1068 cited in cited in 'Good clinical practice guidelines for care home residents with diabetes. A revision document prepared by a Task and Finish Group of Diabetes UK. January 2010

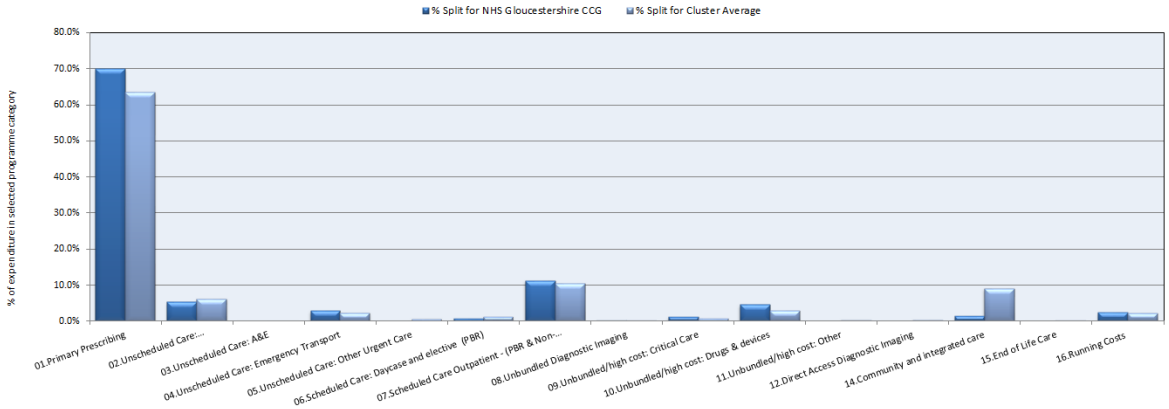
[33] Ferrucci L, Guralnik JM, Pahor Met al (1997). Hospital diagnoses, Medicare charges, and nursing home admissions in the year when older persons become severely disabled. JAMA 277 (9); 728-34

prevalence which found the highest rates of undiagnosed diabetes in Elderly Mentally Infirm (EMI) residential care homes[36] suggests that there may be an advantage in any diabetes education programme for staff care homes being targeted at such homes.

2.2.3. Programme Budget

In 2013/14, Gloucestershire CCG spent a total of £11,501,128[37] on diabetes (£1,918,716 per 100,000 population), with 70.1% of this on primary prescribing and 11.3% on scheduled care (outpatients).The Gloucestershire Primary Care CES estimates that prescribed medicines and related testing account for approximately 75% of total spend on Diabetes. Being a significant area of expenditure, it is imperative that commissioners are assured that prescribing is optimal. Figure 12 shows the county spends more than its peers on primary prescribing (6.4% more), unscheduled care - emergency transport (0.6% more), scheduled care: outpatients - PBR & non-PBR (0.8% more), unbundled/high cost: critical care (0.4% more), unbundled high cost: drugs and devices (1.7% more). Gloucestershire spends much less on community and integrated care (7.6% less). These areas of variance in spend may be worth exploring to see how appropriate these are, with a particular look at the potential impact of the relatively low spend on community and integrated care.

Figure 12: Expenditure Percentage Splits across Care Settings compared to Cluster Average, 2013/14



Source: Department of Health. Programme Budgeting Benchmarking Tool

Expenditure in Gloucestershire on Emergency Transport (per 100,000) was in the highest quintile nationally in 2013/14 at £55,540 versus £47,810 as the peer average spend (Figure 13). It would be important to understand the driver for this with a view to bringing this spend more in line with our peers.

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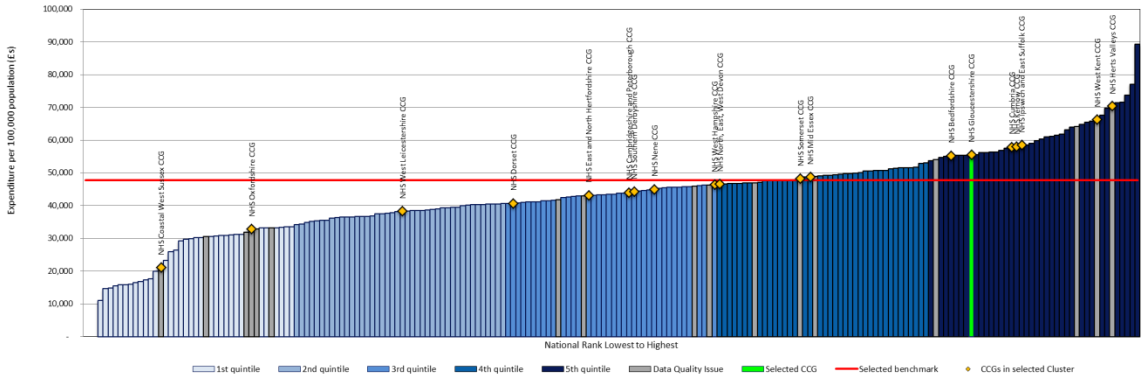
[34] Berlowitz DR, Young GJ, Hickey EC et al (2001). Clinical practice guidelines in the nursing home. Am J Med Qual. Nov-Dec; 16 (6); 189-95 cited in 'Good clinical practice guidelines for care home residents with diabetes. A revision document prepared by a Task and Finish Group of Diabetes UK. January 2010

[35] Duffy RE, Mattson BJ, Zack M (2005). Co-morbidities among Ohio's nursing home residents with diabetes. J Am Med Dir Assoc 6 (6); 383-389 cited in 'Good clinical practice guidelines for care home residents with diabetes. A revision document prepared by a Task and Finish Group of Diabetes UK. January 2010

[36] Aspray TJ, Nesbit K, Cassidy TP et al (2006). Rapid assessment methods used for health-equity audit: diabetes mellitus among frail British care-home residents. Public Health 120 (11); 1042-1051 cited in 'Good clinical practice guidelines for care home residents with diabetes. A revision document prepared by a Task and Finish Group of Diabetes UK. January 2010

[37] 2013/14 CCG programme Budgeting Benchmarking Tool https://www.england.nhs.uk/resources/resources-for-ccgs/prog-budgeting/

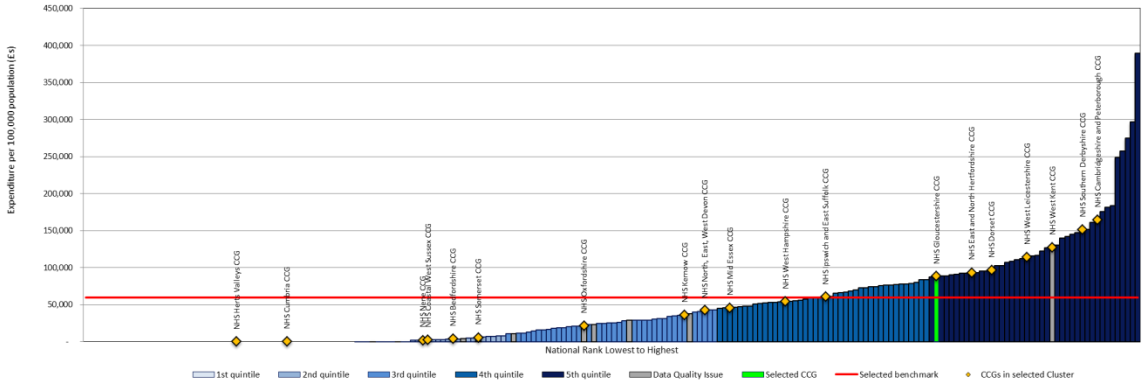
Figure 13: Expenditure per 100,000 Population on Unscheduled Care – Emergency Transport in Gloucestershire versus Cluster Average, 2013/14



Source: Department of Health. Programme Budgeting Benchmarking Tool

Gloucestershire also benchmarked very high (in the fifth quintile nationally) in terms of expenditure on unbundled high cost drugs and devices (Figure 14) spending £88,252 per 100, 000 population as against the peer average of £59,584. It would be worth exploring whether our use of high cost drugs and devices is as optimal as it can be in terms of the potential of replacement with lower cost effective items.

Figure 14: Expenditure per 100,000 Population on Unbundled High Cost: Drugs and Devices in Gloucestershire versus Cluster Average 2013/14

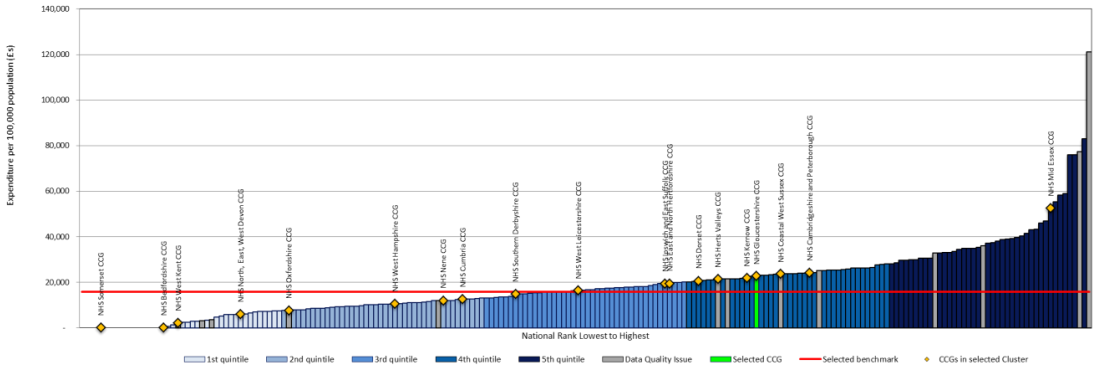


Source: Department of Health. Programme Budgeting Benchmarking Tool

Other areas of relative higher spend include:

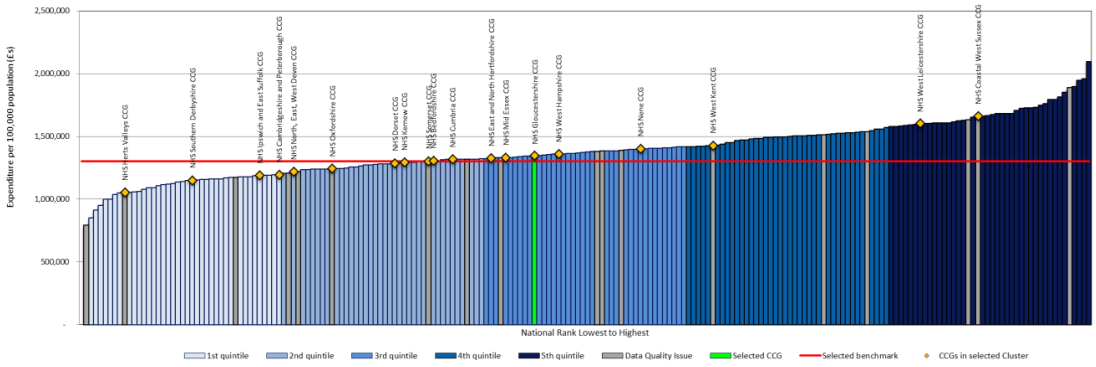
- Unbundled High Cost Critical Care (£22,780 versus £15,760 peer average)- Figure 15
- Primary Prescribing (£1,344,068 versus £1,302,325) - Figure 16

Figure 15: Expenditure per 100,000 Population on Unbundled High Cost Critical Care in Gloucestershire versus Cluster Average, 2013/14



Source: Department of Health. Programme Budgeting Benchmarking Tool

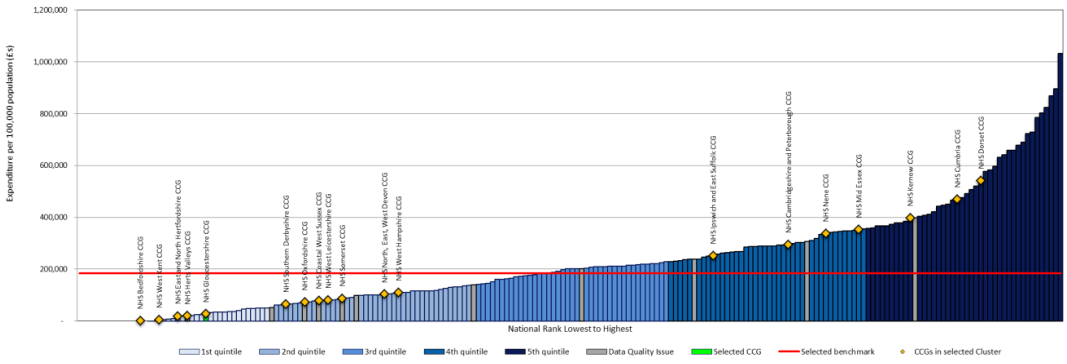
Figure 16: Expenditure per 100,000 Population on Primary Prescribing in Gloucestershire versus Cluster Average, 2013/14



Source: Department of Health. Programme Budgeting Benchmarking Tool

Gloucestershire's spend on Community and Integrated Care was however in the lowest quintile nationally at £27,244 per 100,000 population compared to a peer average of £184,933 (Figure 17)

Figure 17: Expenditure per 100,000 Population on Community and Integrated Care versus Cluster Average, 2013/14



Source: Department of Health. Programme Budgeting Benchmarking Tool

Areas where Gloucestershire is an outlier in terms of spend (i.e. emergency transport, high cost drugs and devices, and community and integrated should be explored further in terms of reaching more optimal spend.

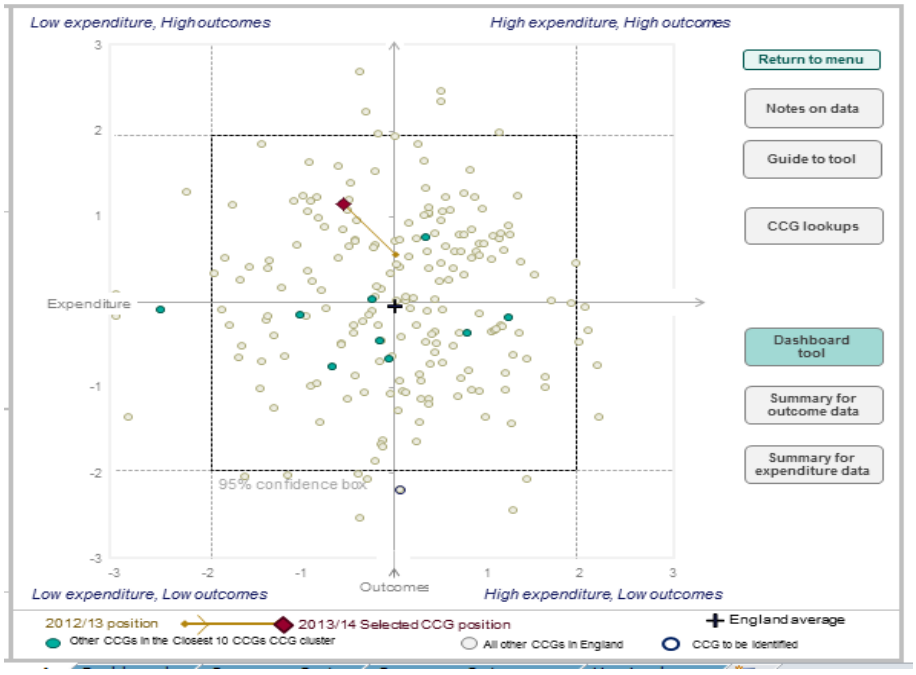
2.2.4. Prescribing Costs and Outcomes

Using optimal glycaemic control (percentage of patients with HbA1c <= 59mmol/mol) as the outcome of choice however, Figure 18 shows that Gloucestershire gets good outcomes for its level of total spend (£269.50) on diabetes prescribing[38], out performing its peers especially in terms of resultant outcome, as well as having moved from a higher level of spend and lower level of outcome from the previous year. Despite this positive performance, there might still be scope for further reducing our expenditures on high cost items without impacting on outcomes

Gloucestershire's performance in terms of **spend versus outcome** is similarly good for:

- Average spend per item on all diabetic items
- Average spend per item on non-insulin anti-diabetic drugs
- Average spend per item on insulin
- Average spend on testing items
- Spend per person item on non-insulin anti-diabetic drugs
- Spend per person item on testing items

Figure 18: Total Spend on Diabetes Prescribing compared to People with Diabetes with a HbA1c of 59mmol/mol or less (including exceptions), 2013/14

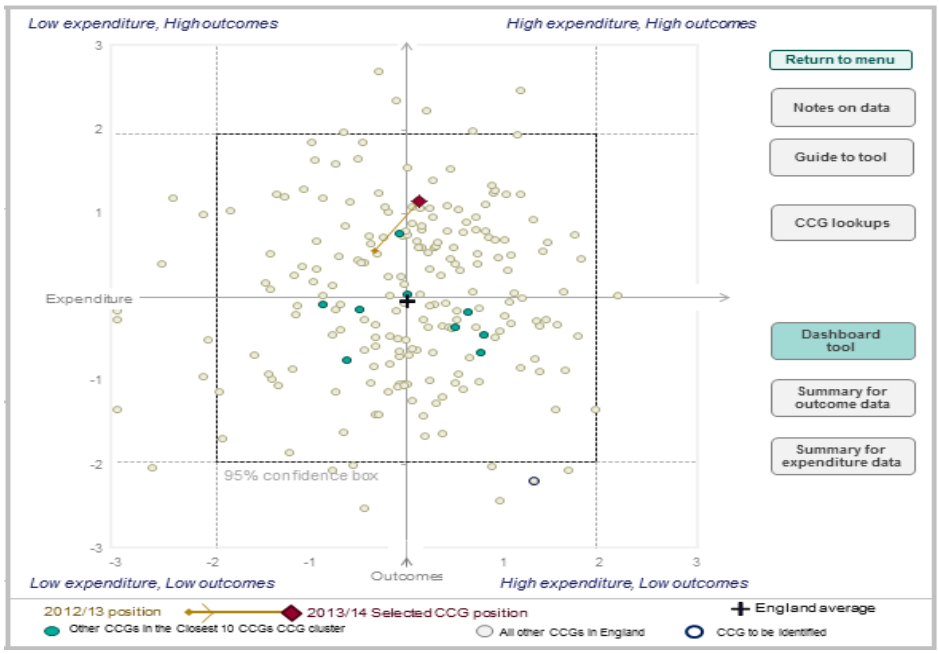


Source: Diabetes Outcomes versus Expenditure (DOVE) Tool for CCGs

[38] Data are presented as the total net ingredient cost (NIC) per person. Spend is the total number of prescriptions divided by the NIC. The prescribing data only covers items prescribed in primary care linked to a practice, not all primary care prescribing. The denominators values for cost per item are the number of items prescribed in the GP prescribing data.

The spend per person item on insulin though resulting in improved outcomes was dependent on increased expenditure from 2012/13 to 2013/14 (Figure 19). The county may want to explore how expenditure may be reduced without compromising on outcomes.

Figure 19: Spend per Person Item on Insulin compared to people with Diabetes with a HbA1c of 59mmol/mol or less (including exceptions), 2013/14



Source: Diabetes Outcomes versus Expenditure (DOVE) Tool for CCGs

2.3. Quality of Life (QoL)

Diabetes is a demanding disease with significant emotional and social burdens which may be compounded by the acute physical distress of hypoglycemia or hyperglycemia and by the chronic physical distress of diabetes-related complications.

There is now good evidence that, among people with diabetes, psychosocial factors such as depression are stronger predictors of medical outcomes such as hospitalization and death than are physical and metabolic factors such as presence of complications, body mass index, or HbA_{1c} level[39]

Perceived quality of life can powerfully affect a person's commitment to active diabetes self-management.

A literature review on quality of life and Diabetes[40] Provides key findings as follows:

- Most studies report worse quality of life for people with Diabetes compared to the general population, especially regarding physical functioning and well-being. This is however less clear when the comparison is with other chronic diseases.

[39] Rosenthal MJ, Fajardo M, Gilmore S, Morley JE, Nabiloff BD: Hospitalization and mortality of diabetes in older adults: a three-year prospective study. Diabetes Care 21:231-35, 1998.

[40] Rubin RR, Peyrot M: Quality of life and diabetes. Diabetes Metab Res Rev 15:205-18, 1999.

- People with Type 1 Diabetes generally report better physical functioning and more energy than those with Type 2 Diabetes, though these differences may be as a result of factors that are associated with the Diabetes type, such as age or even treatment regimen.
- For those with Type 2 Diabetes, treatment intensification from diet alone to oral agents to insulin does seem to be associated with reduced quality of life. This therefore has implications for how these patients are supported
- For people with Type 1 Diabetes, some studies indicate that treatment intensification has no effect on quality of life, with others suggesting that intensification may even enhance quality of life by reducing the immediate and chronic effects of hyperglycaemia. There is some evidence to suggest however very intensive regimens may reduce quality of life through highly demanding self-care regimens and increased incidence of hypoglycaemia.
- There is evidence of a positive association between high levels of perceived quality of life and good glycaemic control, as long as good control is not accompanied by significant increases in treatment burden or hypoglycaemia.
- Some demographic variables are associated with quality of life in people with Diabetes, just as they are in the general population:
    - Men generally report better quality of life than women.
    - Younger people generally report better quality of life than older people.
    - Those with more education or income generally report better quality of life than those with less of either.

  Additional support may therefore need to be provided for specific groups of people to ensure optimal wellbeing.

- Psychosocial factors, including health-related beliefs, social support, coping style, and personality type may have a potent effect on quality of life, which may be direct, or indirect, buffering the negative impact of diabetes or its demands. It has been suggested that , these psychosocial factors may be the most powerful predictors of quality of life, often outweighing the effects of important disease-related factors, such as complications.
- There is evidence that certain interventions, including the introduction of blood glucose-lowering medications or new insulin delivery systems, and educational and counseling interventions designed to facilitate the development of diabetes-specific coping skills, can improve both glycaemic control and quality of life in people with diabetes.
- It has been suggested that coping skills may be the critical factor as it appears that active and effective disease-specific coping can trigger a positive effect of enhanced well-being, more active Diabetes self-management, better glycaemic control, and fewer complications. This suggests that people with diabetes who are not active or effective 'copers' may benefit from interventions designed to enhance their coping skills. The CCG may wish to explore the potential of incorporating coping skills training into the education programme for people newly diagnosed with Diabetes.

2.3.1. Quality of Life (QoL) in CYP with Diabetes Mellitus

Psychological issues (such as anxiety, depression, behavioural problems, eating disorders, conduct disorders and family conflict) have a significant and adverse impact on the management of Type 1 and Type 2 Diabetes, and on the general wellbeing of CYP and their family members or carers. With CYP with diabetes being at high risk of anxiety and depression, it becomes important that they have early access to mental health professionals when they need it. Mental health professionals who have an understanding of diabetes and the particular problems it causes are essential for delivering psychological interventions and engaging with CYP and their families.

CYP with Type 1 Diabetes Mellitus have to deal with a complex and demanding daily treatment regime which can have a negative impact on their QoL. A systematic review found that although such CYP have to live with a demanding treatment regime, overall results revealed that their generic QoL was not impaired compared to healthy peers. However, disease-specific QoL problems, including a negative impact of diabetes on daily functioning, and diabetes-related worries were certainly present. Longitudinal research was thought to be needed in order to provide tailored care for children of all ages with Type 1Diabetes M[41].
End-stage complications have the greatest perceived burden on quality of life; however, comprehensive diabetes treatments also have significant negative quality-of-life effects[42]

Summary

- *The prevalence of Diabetes is increasing (being particularly driven by Type 2 Diabetes). Type 1 Diabetes which is an autoimmune condition often runs in families and people with a close relative with the condition have around a 6% chance of also developing the condition. Type 2 Diabetes which is far more common than Type 1is often associated with obesity and tends to be diagnosed in older people*
- *The death rate has been following a downward trend in the county in line with the national picture, with rates generally higher in males. Mortality is not significantly different from the national average, neither is it significantly different between districts in-county*
- *Significant inequalities exist in the risk of developing Diabetes, in access to health services and the quality of those services, and in health outcomes, particularly with regards to people with Type 2 Diabetes. Socially excluded people and those with learning disabilities or mental health problems may receive poorer quality care. These considerations are important in informing the designing and commissioning of preventive, treatment, care and support services for Diabetes.*
- *The QoF prevalence of Diabetes in county has steadily increased with about 31,547 people (17 years and over) on registers in 2014/15. The variation in prevalence is demonstrated by 23 GP practices (mainly in Cheltenham and Stroud and Berkeley Vale Localities) having prevalence rates significantly lower than the England average, whilst the 13 GP practices with significantly higher rates are evenly split between Gloucester and Forest localities. These two localities also have prevalence rates that are significantly higher than the county average. Such variations need to be taken into account when designing, commissioning, delivering and evaluating services. QoF registers do not however give the full prevalence picture, with there being an estimated 43,015 people aged 16 years and over with diagnosed and undiagnosed Diabetes in Gloucestershire.*
- *Obesity is the most potent risk factor for Type 2 Diabetes accounting for 80-85% of overall risk, with this meaning that Gloucestershire's prevalence of diagnosed and undiagnosed Diabetes will be similar to the national rate by 2035 if current trends in population change and obesity persist.*

[41] Nieuwesteeg, A; Frans Pouwer, Rozemarijn van der Kamp, Hedwig van Bakel, Henk-Jan Aanstoot and Esther Hartman. Quality of Life of Children with Type 1 Diabetes: A Systematic Review.
Curr Diabetes Rev. 2012 Nov;8(6):434-43.

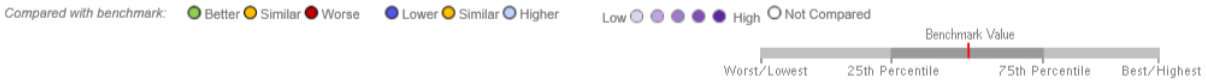
- *Most cases of Type 1 Diabetes are quickly diagnosed with this accounting for about 10% of all adults with diabetes with 90% having Type 2 Diabetes. Type 1 Diabetes which is the most common type of Diabetes in childhood is becoming more common. 283 CYP (aged up to 24 years) received treatment for Diabetes in Cheltenham General Hospital and Gloucestershire Royal Hospital in 2014/15, 98.2% of whom had Type 1 Diabetes (higher than the regional and national averages). Though much less common in CYP, Type 2 Diabetes appears to be increasing nationally, particularly in South Asians and Black ethnic groups being strongly associated with adiposity and family history. With some evidence of potential acceleration of complications in CYP with Type 2 Diabetes, education about the increased risk as well as early and optimal management as well as close monitoring and secondary prevention becomes extremely important in this cohort of CYP.*
- *Direct costs of Diabetes Mellitus takes up 10% of the NHS budget in the UK with 80% of this cost attributable to complications – heart disease, excess inpatient stay and kidney disease. In England, treatment costs accounts for 31% of total costs with complications accounting for 69%. Optimal management to prevent the development of complications is an imperative in terms of effective use of funds. Gloucestershire would need significant action on improving prevention and current treatment regimes of Diabetes if the projected increase in NHS cost is to be stemmed. Social care cost is not spared as Diabetes is known to double the risk of admission to care homes with the condition accounting for up to one in four residents, with the highest rate of undiagnosed Diabetes in care homes for the Elderly Mentally Infirm. Such care homes will benefit from targeted Diabetes education and support programmes.*
- *Gloucestershire spent £11,501,128 on Diabetes in 2013/14 – 70.1% on primary prescribing and 11.3% on scheduled care. The county was in the highest quintile nationally in terms of spend per 100,000 for Emergency Transport, as well as for unbundled high cost drugs and devices. It however was in the lowest quintile in terms of community and integrated care. These areas should be explored further in terms of optimal spend. Despite spending 6.4%more than peers on primary prescribing, Gloucestershire however gets better outcomes for its level of total spend on Diabetes prescribing compared with its peers. Nonetheless, the county may want to explore how spend per person item on insulin can be further improved without compromising on the good outcomes given the increase in expenditure over the previous year.*
- *Diabetes is a demanding disease with significant emotional and social burdens. Psychosocial factors such as depression are found to be stronger predictors of medical outcomes (e.g. hospitalisation and death) compared to factors such as complications, BMI, or HbA1c levels. People with Type 1 Diabetes generally report better physical functioning and more energy than those with Type 2 Diabetes, whilst adults with Type 2 Diabetes undergoing treatment intensification from diet alone to oral agents to insulin seem to be associated with reduced quality of life. This therefore has implications for how these patients are supported. Intensification of treatment for adults with Type 1 Diabetes does not seem to affect QoL except perhaps for very intensive treatments with highly demanding self-care regimens and increased incidence of hypoglycaemia. Men, younger people and those with higher education/ income generally report higher QoL. Additional support may therefore need to be provided for specific groups of people to ensure optimal wellbeing. Coping skills are a critical factor in engendering a positive effect of enhanced well-being, more active Diabetes self-management, better glycaemic control, and fewer complications. The CCG may therefore*

wish to explore the potential of incorporating coping skills training into the education programme for people newly diagnosed with Diabetes. CYP with diabetes are at high risk of anxiety and depression, and therefore need early access to mental health professionals who have an understanding of diabetes, when they need it. Despite having a to deal with a complex and demanding daily treatment regime, CYP with Type 1 Diabetes, their ***generic*** *QoL appear not to be impaired when compared to healthy peers.*

3. Risk Factors

Table 4 shows Gloucestershire's values in terms of pertinent risk factors namely age, deprivation and ethnicity, and how these compare with peer group and national averages. The proportion of older people in the county is similar to its peer group (but higher than national average), whilst the proportion of its population who are Asian/Asian British is lower than the peer and national averages.

Table 4: Diabetes Prevalence and Risk Factors



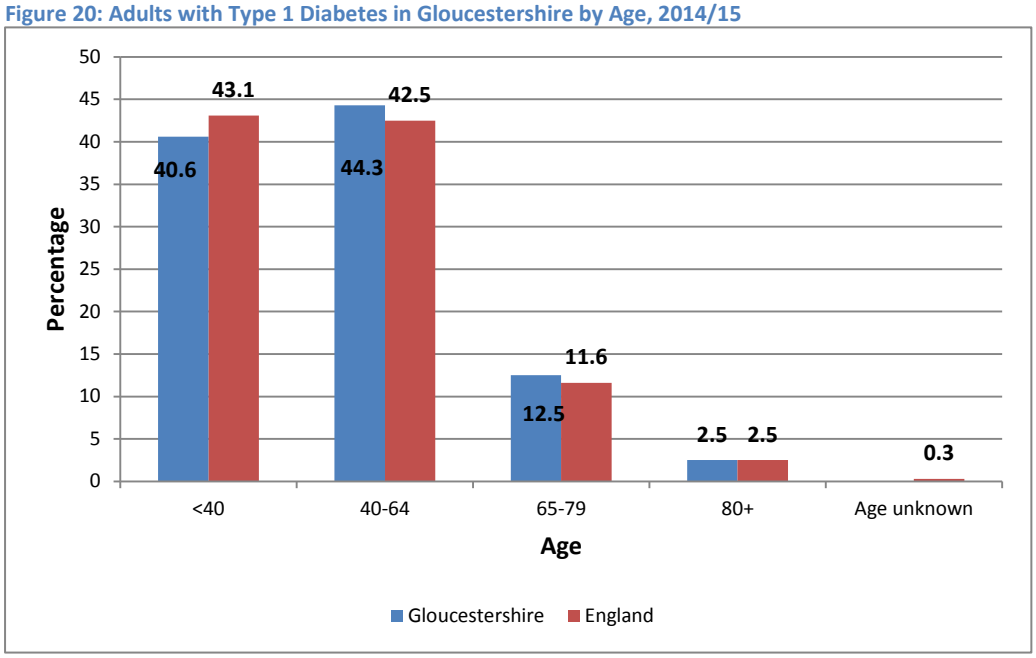
Indicator	Period	Gloucestershire		ONS 2001 cluster group	England	Prospering Smaller Towns		
		Count	Value	Value	Value	Worst/ Lowest	Range	Best/ Highest
Deprivation score (IMD 2015)	2015	-	15.0	-	21.8	-	-	-
People over 65	2015	127,093	20.1%	20.2%	17.1%	16.1%		25.4%
Diabetes prevalence	2014/15	31,547	6.1%	6.1%	6.4%	4.6%		8.0%
GP recorded prevalence of obesity in adults (16+)	2014/15	46,306	8.9%	8.8%	9.0%	12.3%		6.7%
Percentage of population who identify their ethnicity as Asian or Asian British	2011	12,433	2.1%	2.8%	7.8%	0.8%		7.9%

Source:
http://fingertips.phe.org.uk/diabetes#page/1/gid/1938132727/pat/110/par/ONS_5.07/ati/19/are/E38000062/iid/91036/age/1/sex/4

3.1. Type 1 Diabetes

Type1 Diabetes can develop at any age, but usually appears **before the age of 40 years**. Figure 20 shows that about 85% of adult cases in Gloucestershire in 2014/15 are aged under 65 years, with about one in four aged under 40 years of age. Appropriate management of this cohort has major implications for economic wellbeing as a significant proportion are of working age, and should therefore be of focus for the county.

Figure 20: Adults with Type 1 Diabetes in Gloucestershire by Age, 2014/15

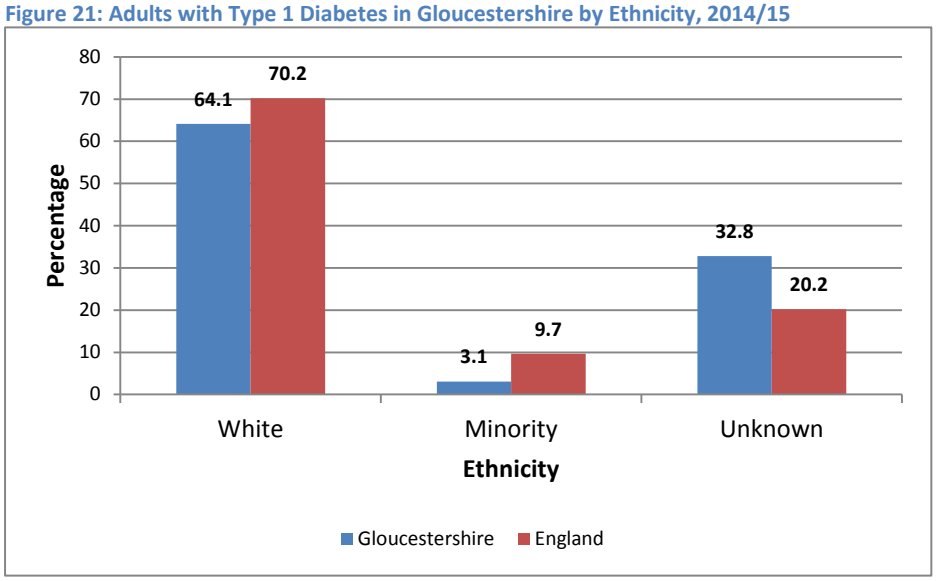


Source: National Diabetes Audit

With the condition being often **inherited**, having a **close relative** with Type 1 Diabetes (e.g. parent, brother or sister) leads to about 6% chance of also developing the condition. The risk for people who don't have a close relative with Type 1 Diabetes is much lower at just under 0.5%. This underscores the importance of close relatives being aware of symptoms of the disease to enable prompt diagnosis and management, should the disease occur in them.

Though ethnicity as a risk factor is more of an issue for Type 2 rather than Type 1 Diabetes in the UK, it has been suggested that Caucasians in the Unites States seem to be more susceptible to Type 1 than African-Americans and Hispanic-Americans. Chinese people have a lower risk of developing Type 1, as do people in South America. Figure 21 shows that almost a third of adults with Type1 Diabetes did not have their ethnicity recorded (as against the England average of 20%). This might partly explain the lower proportion of adults from ethnic minority groups in Gloucestershire. The recording of ethnicity needs to improve to enable a better understanding of the distribution of the condition in Gloucestershire

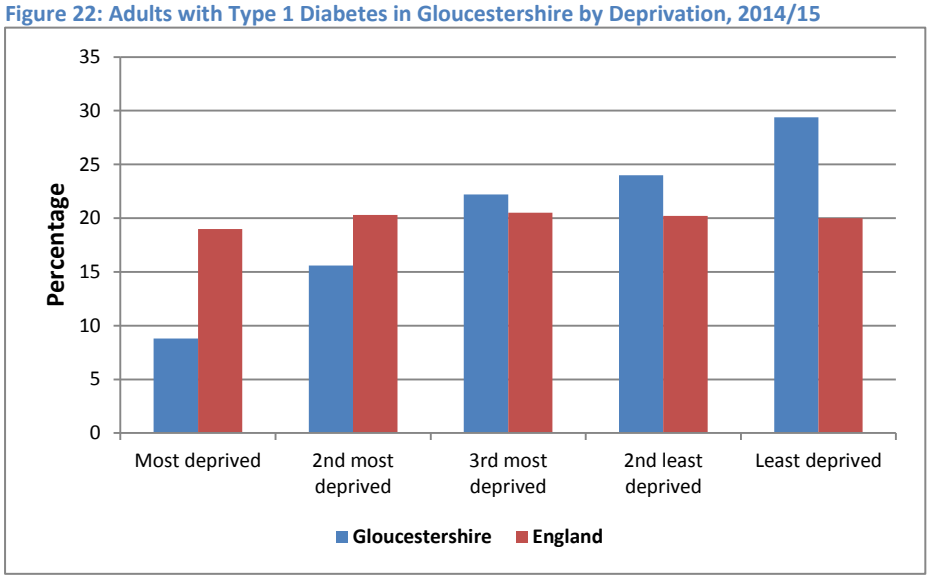
Figure 21: Adults with Type 1 Diabetes in Gloucestershire by Ethnicity, 2014/15



Source: National Diabetes Audit

Deprivation is strongly associated with higher levels of poor lifestyle choices as well as poor blood control which are linked to the risk of serious complications amongst those already diagnosed with Type 1 Diabetes[43]. Figure 22 shows a strong inverse relation between deprivation and Type 1 Diabetes suggesting that this condition is more prevalent in more affluent areas of the county. Such an association was however not evident with the national picture.

Figure 22: Adults with Type 1 Diabetes in Gloucestershire by Deprivation, 2014/15



Source: National Diabetes Audit

3.2. Type 2 Diabetes

The main risk factors for developing this condition are:

- Age – being over the age of 40 (over 25 for south Asian people)
- Genetics – having a close relative with the condition, such as a parent, brother or sister

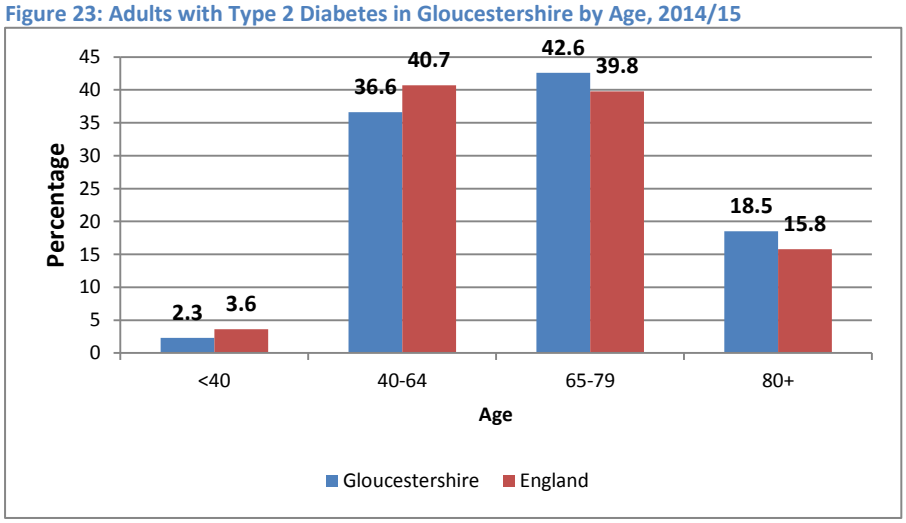
[43] Diabetes UK. Diabetes in the UK 2009: Key statistics on Diabetes

- Weight – being overweight or obese
- Ethnicity – being of south Asian, Chinese, African-Caribbean or black African origin

3.2.1. Age

Though Type 2 Diabetes occurs mainly in adults aged 40 years and over, it is now becoming more common in young adults, teens and children. Figure 23 shows that Gloucestershire's distribution by age is as to be expected. The county however has a higher proportion of people with the condition in the older age bands compared with the England average which may be as a result of its ageing demography.

Figure 23: Adults with Type 2 Diabetes in Gloucestershire by Age, 2014/15



Source: National Diabetes Audit

3.2.2. Weight

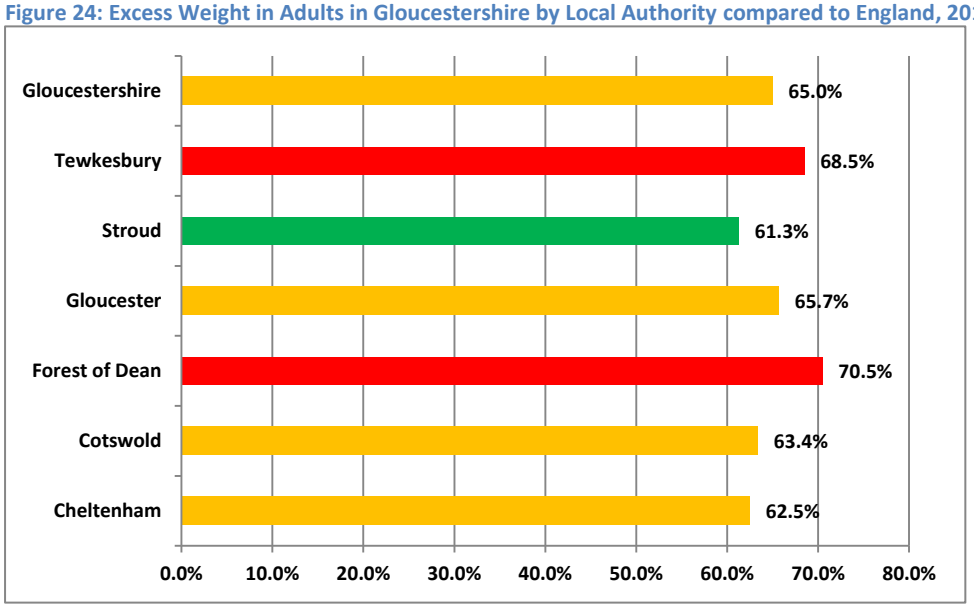
3.2.2.1. Obesity in Adults

In Gloucestershire, the percentage of adults (16+) classified as having '**excess weight'** (i.e. overweight **or** obese) is 65%[44] which is not significantly different from the England average. Figure 24 shows that Forest of Dean and Tewkesbury Districts have significantly higher rates of **excess weight**[45]in adults compared with the England average.

[44] 2012-2014, Public Health Outcomes Framework

[45] Excess weight refers to people who are overweight (BMI 25 to<30) or obese (BMI 30 or higher)

Figure 24: Excess Weight in Adults in Gloucestershire by Local Authority compared to England, 2012/14

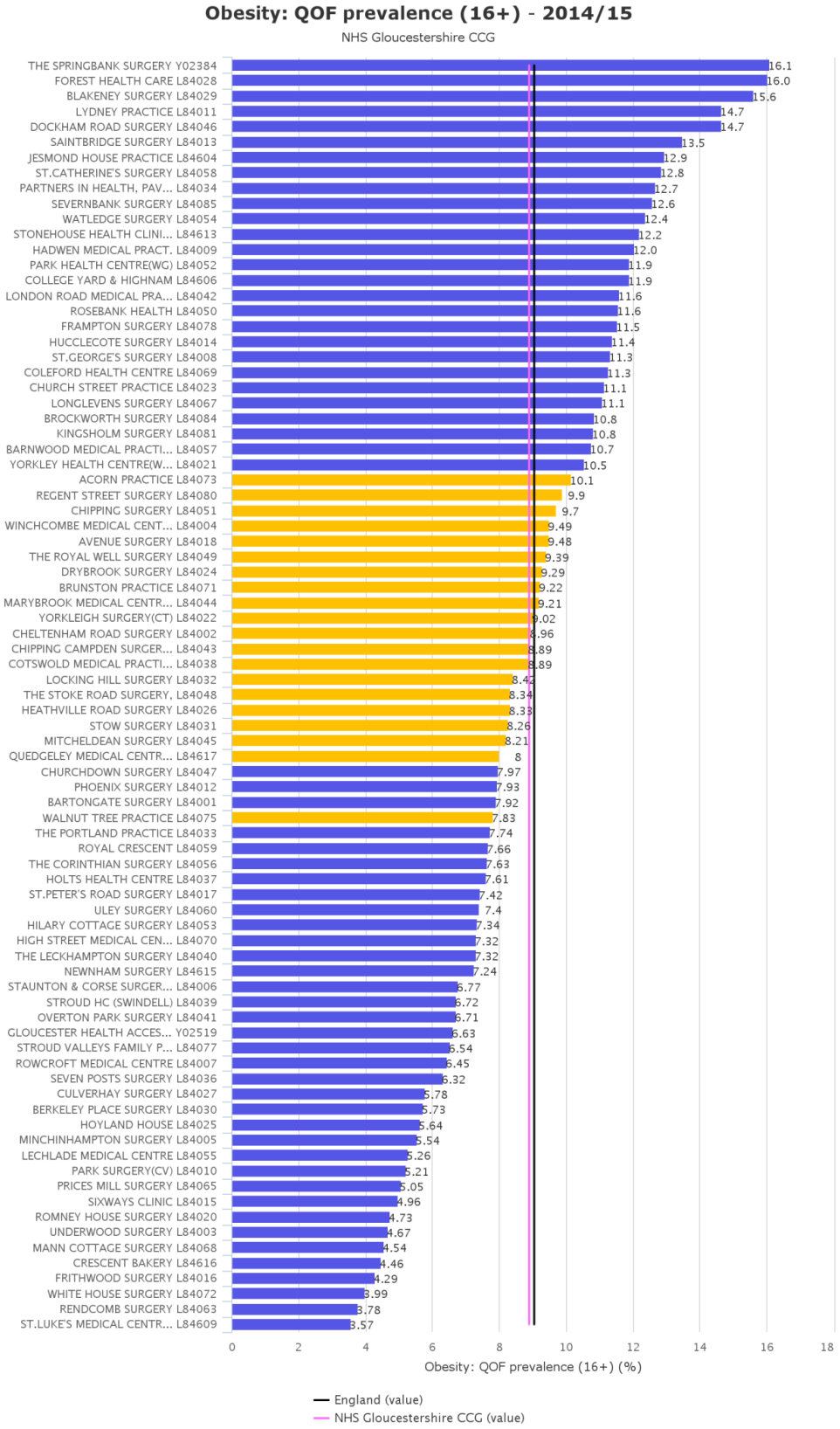


Significantly lower	Similar	Significantly higher

Source: Public Health Outcomes Framework

The GP recorded prevalence of obesity in adults aged 16+ in 2014/15 was 8.9% in Gloucestershire (England 9%, Peers 8.8%) – giving a total population of 46,306 (Table 4). There is a huge variation in the prevalence across GP practices ranging from 3.57% to 16.1%, as against the national average of 9%. Out of the 27 practices with significantly high **obesity** rates, almost half (48%) are in Gloucester locality, 26% in Forest locality and 11% in Tewkesbury (Figure 25). Gloucester, Forest of Dean and Tewkesbury localities may as a matter pf priority, wish to assure themselves of the accessibility and adequacy of the provision of prevention and management interventions for obesity in their localities.

Figure 25: Prevalence (QoF) of Obesity in Gloucestershire Adults by GP Practice, 2014/15



Source: National GP Profiles

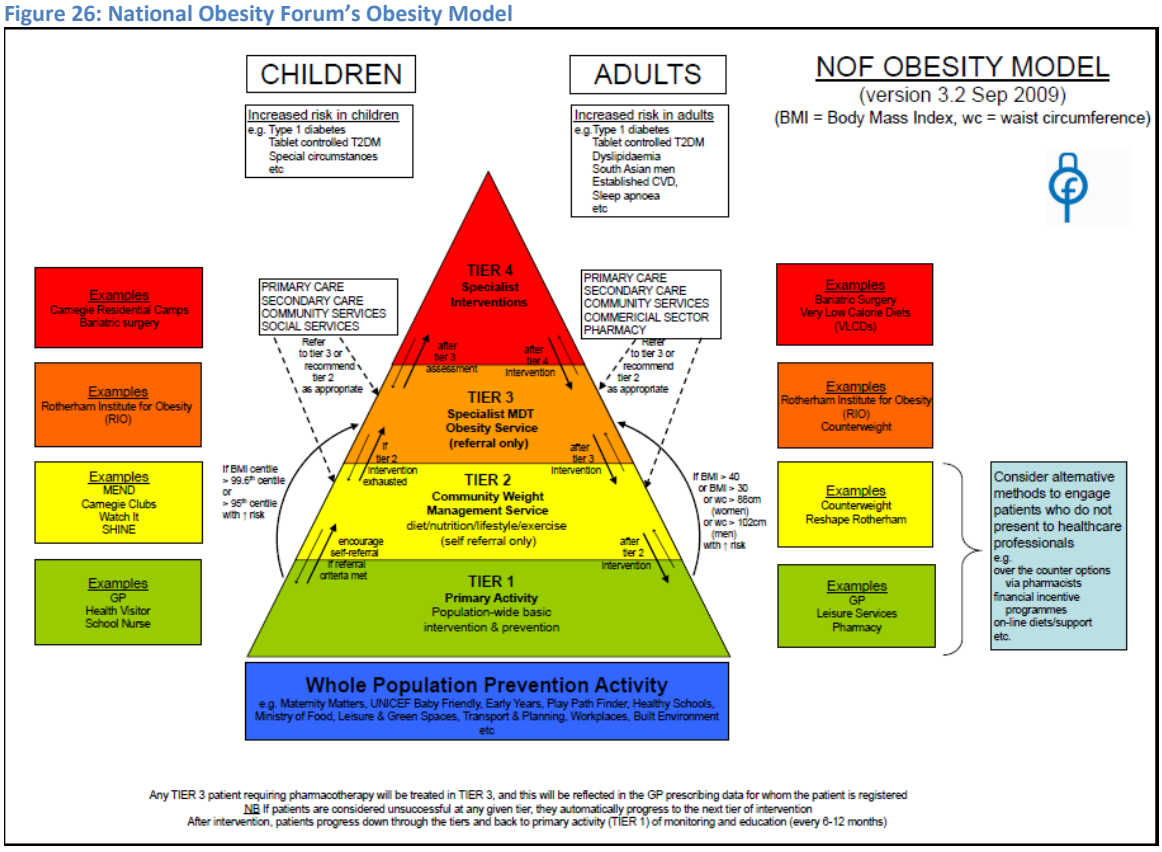
Evidence suggests that for women, obesity prevalence increases with greater levels of deprivation. For men however, only occupation-based and qualification-based measures show differences in

obesity rates by levels of deprivation. For both men and women, obesity prevalence decreases with increasing levels of educational attainment. The relatively high standards of living and educational attainment and skills base of residents compared with the England Average[46] may partly explain the lack of correlation seen in Gloucestershire between deprivation and Type 2 Diabetes (against expectations). Women from Black African groups appear to have the highest prevalence of obesity and men from Chinese and Bangladeshi groups have the lowest[47]. These observations have important implications for how obesity prevention and treatment services are designed and delivered in the county and should therefore inform the targeting of service provision and accessibility considerations

3.2.2.2. Adult Healthy Weight Interventions/Services

The services and interventions to address obesity can be considered along a '**tiered**' model as detailed in Figure 26 below.

Figure 26: National Obesity Forum's Obesity Model



Source: http://www.nationalobesityforum.org.uk/media/PDFs/NOFobesitystrategynewformat.pdf

Table 5 shows examples of what is available in the county for maintaining a healthy weight for adults across the different tiers. NHS England has since April 2013 commissioned Complex and Specialised Obesity Surgery for children and adults, with CCGs expected to take on commissioning responsibility

[46] Understanding Gloucestershire JSNA – Gloucestershire Context
[47] Public Health England Obesity. http://www.noo.org.uk/NOO_about_obesity/inequalities

for bariatric surgery for adult patients aged 26 years and over from April 2016. Work is currently underway in terms of reviewing interventions and services available to adults across the county under the auspices of the Health and Wellbeing Board's Obesity delivery card. This work aims to ensure that current services are optimal in terms of their ability to meet the need of residents.

Table 5: Current Tiered Provision of Interventions and Services for Healthy Weight for Adults in Gloucestershire

Tier of Intervention/Service	Composition	In-county Examples
Whole population prevention activity	Includes measures to address wider social, economic and environmental determinants of obesity	Leisure Centres/Activities, Green Spaces, Transport & Planning, Built Environment
Tier 1	Range of community-based prevention and early intervention services (self-care)	Walking for health, workplace health initiatives, NHS Health Checks
Tier 2	Community and primary care weight management services	Slimming World, Exercise on Prescription, Pharmaceutical interventions e.g. (Orlistat)
Tier3	Specialist multi-disciplinary team weight management services	Specialist Weight Management Service (hospital-based)
Tier 4	Specialised medical services including surgery	Bariatric surgery

3.2.2.2.1. Slimming World

This Tier 2 service which offers 12 sessions to those referred, accepts people who are:

- Obese (BMI => 30, or BMI => 28 with significant co-morbidity e.g. insulin resistance, diabetes, hypertension, osteoarthritis, depression) or ≥27.5 if South Asian, Chinese, black African or Black-Caribbean ethnicity
- Aged 18+
- Ready to commit to the programme

The service has enjoyed a lot of success since it was piloted for a year from September 2013, with appreciable weight loss in participants as follows:

- Overall, 63% of people achieved weight loss
- 19% achieved 3% weight loss
- 36% achieved 5% weight loss
- 9% achieved 10% weight loss

The access rate[48] is highest for Forest Locality (Table 6), which seems appropriate given the fact that Forest of Dean District has levels of excess weight significantly higher than the national average when compared with other local authorities in the county (Figure 24 above). It is interesting however to see that the access rate for Tewkesbury Locality is lower than that of Stroud and Berkeley Vale. This would benefit from further exploration especially in light of Stroud District having a significantly lower rate of excess weight, whilst this is higher for Tewkesbury district. Such an exploration would enable us assure ourselves that there is optimal access to this service in the areas with higher need.

[48] Number of referrals per 1000 population

Table 6: Slimming World Referrals and Access Rate by GP Locality, April 2014 to Date

Locality	Total Referrals	Access Rate
Forest	1,367	21.7
Gloucester City	3,443	20.3
Stroud and Berkeley Vale	2,250	18.9
Tewkesbury	756	17.7
Cheltenham	2,284	14.8
South Cotswold	861	14.8
North Cotswold	335	11.5

With most of the referrals being from White British Ethnic Group (93.1%) and only 1.1% from Black and 0.7% from Asian groups, the service should explore improved targeting of the service to these population groups given their higher risk profile.

3.2.2.2.2. Tier 3 Service

This service which is an effective and important pre-requisite for Tier 4 surgical services engages users who are:

- Individuals who have not been successful with weight loss or maintenance of weight loss from Tier 1 or Tier 2
- Individuals with BMI ≥ 35 with co-morbidities
- Individuals with BMI ≥ 40 with or without co-morbidities

NHS England estimates that a total of 10,784 people aged 18 and over would be needing Tier 3 services in Gloucestershire, with about 3,921 of these currently in contact with GP services. The county however currently has 400 patients per year in Tier 3 services. It is therefore recommended that the ongoing review of adult weight management services specifically explore optimal access to Tier 3 services.

3.2.2.2.3. Tier 4 Service

The current access criteria for adult Tier 4 surgery are:

- Age 18 and over
- Morbid/severe obesity has been present for at least five years
- Very obese/morbidly obese individuals : BMI > 50
- Those who have successfully engaged with Tier 3 service for 12 -24 months and have:
    - BMI of 40 or more
    - BMI between 35 and 40 in the presence of other significant disease
- Revision surgery

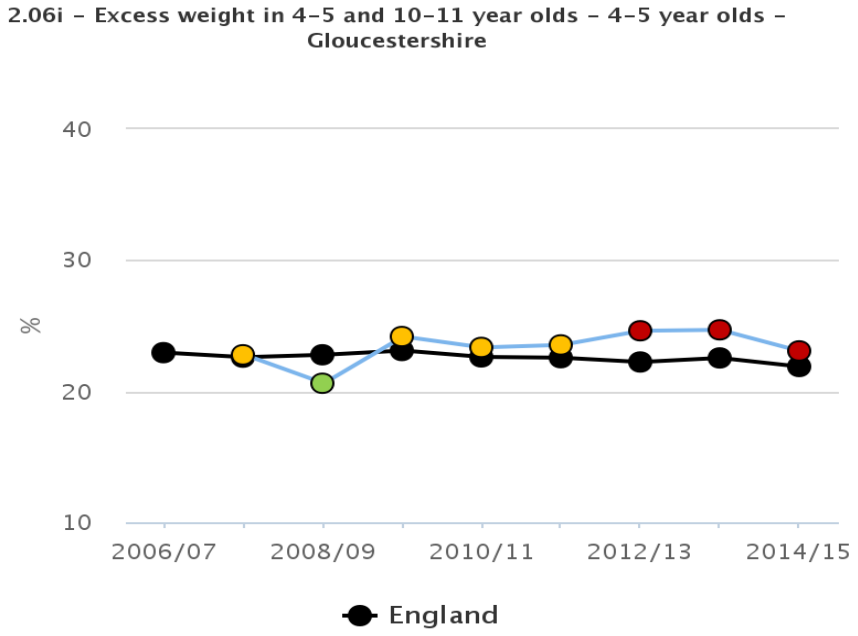
Gloucestershire patients are able to access Tier 4 service from GHNHST, North Bristol NHS Trust of Musgrove Park Hospital Taunton, depending on BMI/complexity

3.2.2.3. Obesity in Children

There is an imperative to continue to address childhood obesity in the county, especially in light of **excess weight in 4 to 5 year olds** in the county which is significantly higher than national rate,

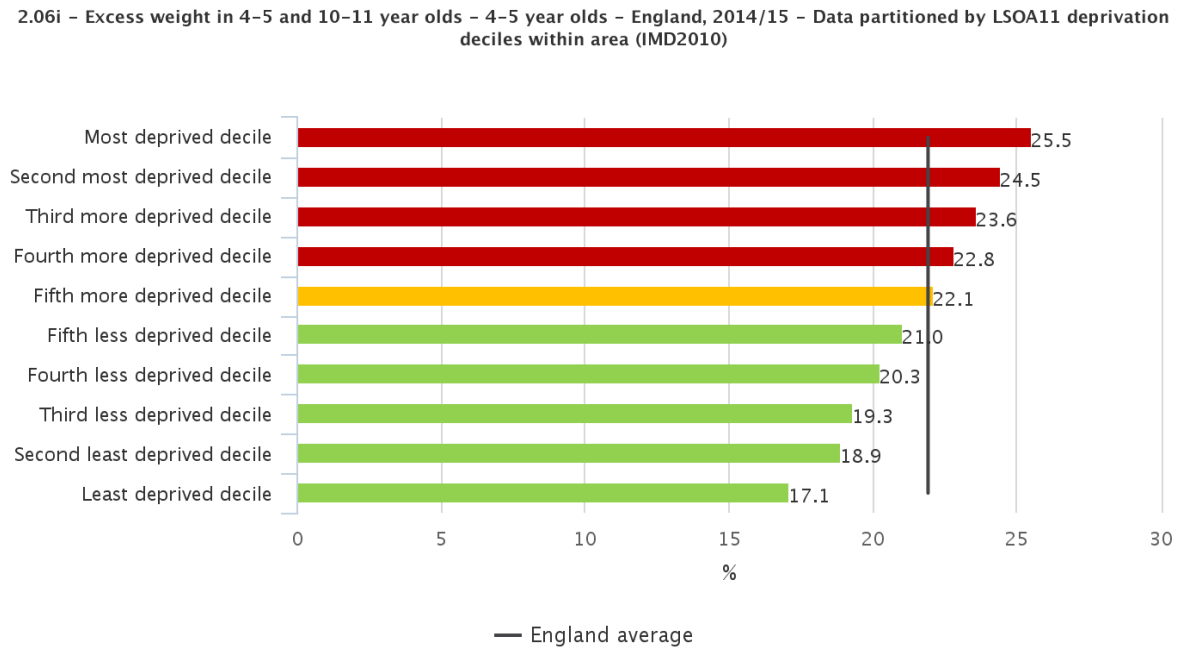
especially in our areas of higher deprivation (see Figure 27 and Figure 28 below). Childhood obesity which is a recognised risk factor for developing Type 2 Diabetes as an adult is also strongly associated with deprivation.

Figure 27: Trend in Excess Weight in Children aged 4 -5 years in Gloucestershire, 2006/7 – 2014/15



Source: Public Health Outcomes Framework http://www.phoutcomes.info/

Figure 28: Excess Weight in Gloucestershire Children aged 4 – 5 years by Deprivation, 2014/15



Source: Public Health Outcomes Framework http://www.phoutcomes.info/

3.2.2.4. Children's Weight Management Services

There is recognition in the county of many gaps in the provision of weight management interventions and services for children across the various tiers of provision. Table 7 gives examples of

what is currently available in-county. Concerted work is on-going in terms of the development of an appropriate pathway that fills the identified gaps effectively. Such a pathway would need to appropriately target our areas of deprivation.

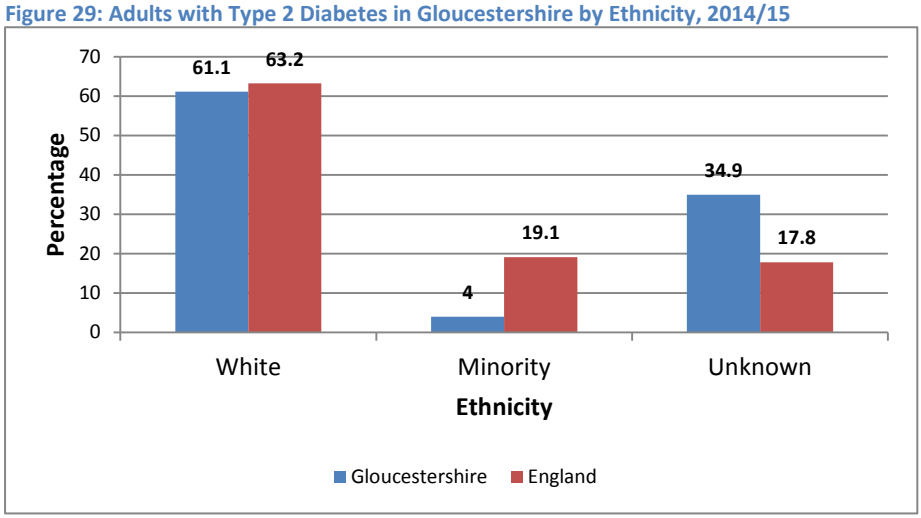
Table 7: Current Tiered Provision of Interventions and Services for Healthy Weight for Children in Gloucestershire

Tier of Intervention/Service	Composition	In-county Examples
Whole population prevention activity	Includes measures to address wider social, economic and environmental determinants of obesity	Baby Friendly Hospital Initiative, Breastfeeding, Early Years, School-based health interventions (GHLL[49]),
Tier 1	Range of community-based prevention and early intervention services (self-care)	Healthy Child Programme (HCP), Family Interventions pilot (Cheltenham), Youth Health Champions, School Nursing Service.
Tier 2	Community and primary care weight management services	Dietetics – community clinics
Tier3	Specialist multi-disciplinary team weight management services	Ad-hoc referrals to Care of Childhood Obesity (COCO) Clinic in Bristol.
Tier 4	Specialised medical services including surgery	

3.2.3. Ethnicity

Type 2 Diabetes is up to six times more common in south Asian communities than in the general UK population, and it's three times more common among people of African and African-Caribbean origin. Figure 29 shows that only 4% of Gloucestershire adults with Type 2 Diabetes are from minority ethnic groups compared to 19% nationally. This needs to be interpreted with great caution especially against the backdrop of the 2013 Census figure which showed that the black and minority ethnic groups made up 4.6% of the population. Furthermore, this graph also shows that more than a third of adults had 'unknown' ethnicity (compared with about 18% nationally), some of who could be from the BME group. The recording of this information should be an area of focus for the future.

Figure 29: Adults with Type 2 Diabetes in Gloucestershire by Ethnicity, 2014/15

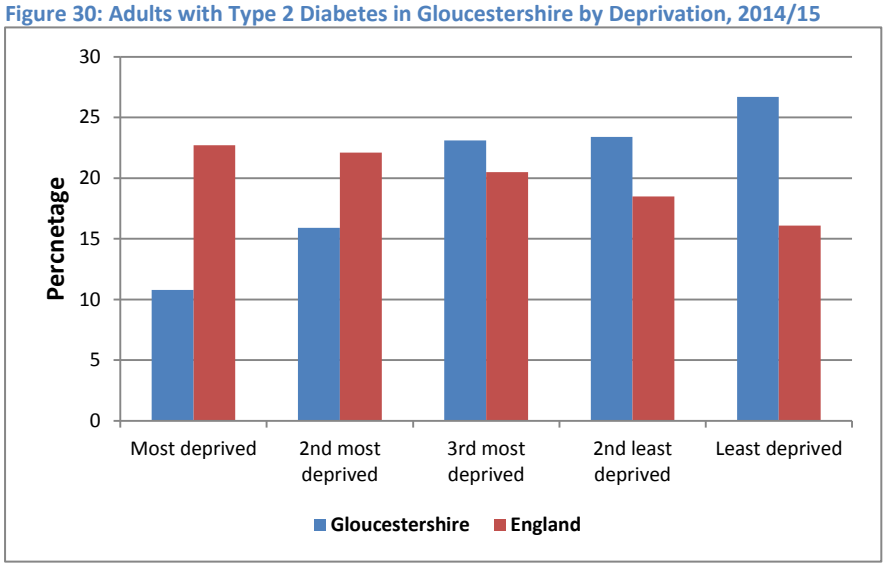


[49] Gloucestershire Healthy Living and Learning http://www.ghll.org.uk/

Source: National Diabetes Audit

Deprivation is strongly associated with higher levels of obesity, physical inactivity, unhealthy diet, smoking and poor blood pressure control, which are in turn linked to the risk of developing Type 2 Diabetes and the risk of serious complications amongst those already diagnosed with both Type 1 and Type 2 diabetes. Figure 30 shows a positive correlation between deprivation and Type 2 Diabetes at the national level, but this is not replicated in Gloucestershire.

Figure 30: Adults with Type 2 Diabetes in Gloucestershire by Deprivation, 2014/15



Source: National Diabetes Audit

Summary

- *Type1 Diabetes usually appears before the age of 40 years with about 85% of adult cases in Gloucestershire in 2014/15 aged under 65 years, and one in four aged under 40 years of age. Appropriate management of this cohort has major implications for economic wellbeing as a significant proportion are of working age, and should therefore be of focus for the county. Having a close relative with the condition leads to about 6% chance of also developing it. This underscores the importance of close relatives being aware of symptoms of the disease to enable prompt diagnosis and management, should the disease occur in them. Deprivation is strongly associated with higher levels of poor lifestyle choices as well as poor blood control which are linked to the risk of serious complications amongst those already diagnosed with Type 1 Diabetes.*
- *Type 2 Diabetes though occurring mainly in adults aged 40 years and over, is now becoming more common in CYP. Gloucestershire has a higher proportion of people with the condition in the older age bands compared with the England average. Having a close relative with the condition, ethnicity (south Asian, Chinese, and Black) and being overweight or obese are also risk factors*
- *Women from Black African groups appear to have the highest prevalence of obesity and men from Chinese and Bangladeshi groups have the lowest. These observations have important implications for how obesity prevention and treatment services are designed and delivered in the county and should therefore inform the targeting of service provision and accessibility considerations. Forest of Dean and Tewkesbury Districts have significantly higher rates of*

excess weight in adults compared with the England average. Gloucestershire GP registers showed there were 46,306 people aged 16 years and over who were obese in 2014/15. Almost half (48%) of the 27 practices with significantly high obesity rates, are in Gloucester locality, 26% in Forest locality and 11% in Tewkesbury These localities may as a matter of priority, may wish to assure themselves of the accessibility and adequacy of the provision of prevention and management interventions for obesity in their localities.

- *There are a number of services/interventions available to help maintain a healthy weight in CYP and adults across the county. Work is currently underway in terms of reviewing interventions and services available to adults across the county under the auspices of the Health and Wellbeing Board's Obesity delivery card. This work aims to ensure that current services are optimal in terms of their ability to meet the need of residents. 'Slimming World' a Tier 2 services for adults in the county has enjoyed significant success in terms of weight loss in adults referred. Access rates across the localities would benefit from exploration to ensure that there is optimal access to this service in the areas with higher need. The service should also explore improved targeting of the service to population groups with a higher risk profile. There are an estimated 3,921 adults who can benefit from Tier 3 services and are currently in contact with GP services. The county however currently has 400 patients per year in Tier 3 services. It is therefore recommended that the ongoing review of adult weight management services specifically explore optimal access to Tier 3 services. Gloucestershire patients are able to access Tier 4 service from GHNHST, North Bristol NHS Trust of Musgrove Park Hospital Taunton, depending on BMI/complexity. There is an imperative to continue to address childhood obesity in the county, especially in light of excess weight in 4 to 5 year olds in the county which is significantly higher than national rate, especially in our areas of higher deprivation. Childhood obesity is a recognised risk factor for developing Type 2 Diabetes as an adult.* There is recognition in the county of many gaps in the provision of weight management interventions and services for children across the various tiers of provision and there is ongoing work to start to address this.
- *Type 2 Diabetes is up to six times more common in south Asian communities than in the general UK population, and it's three times more common among people of African and African-Caribbean origin. The National Diabetes Audit showed that that only 4% of Gloucestershire adults with Type 2 Diabetes are from minority ethnic groups compared to 19% nationally in 2014/15. This needs to be interpreted with great caution especially as more than a third of adults had 'unknown' ethnicity (compared with about 18% nationally), some of who could be from the BME group. The recording of ethnicity should be an area of focus for the future.*
- *Deprivation is strongly associated with higher levels of obesity, physical inactivity, unhealthy diet, smoking and poor blood pressure control, which are in turn linked to the risk of developing Type 2 Diabetes and the risk of serious complications amongst those already diagnosed with both Type 1 and Type 2 Diabetes*

4. Prevention of Diabetes

At present, Type 1 Diabetes cannot be prevented as the environmental triggers that are thought to generate the process resulting in the destruction of the body's insulin-producing cells are still under investigation. There is however a lot of evidence that lifestyle changes can help prevent the development of Type 2 Diabetes.

Consideration of prevention interventions would cut across primary, secondary and tertiary levels.

4.1. Primary Prevention

Primary Prevention would be aiming at stopping Type 2 Diabetes from occurring in the first place. Avoidance of obesity is the major target of primary prevention, with this being achieved mainly through increased exercise or restricted calorie intake. Interventions would fall under 'whole population prevention activity' as well as some aspects of Tier 1 services as detailed in Figure 26, Table 5 and Table 7.

Relevant healthy lifestyle messages and interventions can also be targeted at people at high risk of developing the condition i.e. those who are aged 40 and above, those who have a family history of the disease, those with low levels of physical activity and those who are overweight. These groups should be considered for prioritisation within the re-procured lifestyle service in the county.

4.2. Secondary Prevention

Secondary Prevention is based on the **earliest possible identification of the Type 2 Diabetes** (e.g. borderline elevations of blood glucose or other markers of risk**), with a view to delivering early evidence-based interventions.**

4.2.1. Prediabetes (non-diabetic hyperglycaemia)

Prediabetes refers to a situation where a person's blood glucose levels are higher than normal but not high enough for a diagnosis of Type 2 Diabetes Mellitus. Many people destined to develop Type 2 Diabetes spend many years in a state of prediabetes

Public Health England (PHE) using several years' Health Survey for England (HSE) HbA1c data estimated the prevalence of this condition at 10.1% nationally in 2013[50]. In Gloucestershire, PHE modelled the local prevalence of prediabetes to be 11.7% i.e. 59,111 people aged 16 years and over[51]. This is the cohort of people to be targeted if Gloucestershire succeeds in its bid to run the **NHS Diabetes Prevention Programme – Healthier You,** which was launched in March 2015 and expected to be rolled out nationwide by 2020. Those referred to the programme will get tailored, personalised help to reduce their risk of Type 2 Diabetes. Appendix 1 shows the pathway for the NHS DPP.

America's YMCA's Diabetes Prevention Programme (upon which the NDPP is predicated) was found to be able to **reduce the number of new cases** of Type 2 Diabetes by as much as 58% and by 71% among adults aged 60 or older compared to those not receiving the intervention[52].

[50] Public Health England (2015). NHS Diabetes Prevention Programme (NHS DPP) Non-diabetic hyperglycaemia. https://www.gov.uk/government/publications/nhs-diabetes-prevention-programme-non-diabetic-hyperglycaemia

[51] https://www.gov.uk/government/publications/nhs-diabetes-prevention-programme-non-diabetic-hyperglycaemia

[52] https://www.england.nhs.uk/2016/07/type-2-films/

The NHS DPP behavioural intervention will be underpinned by three core goals:

- Weight loss
- Achievement of dietary recommendations
- Achievement of physical activity recommendations

The intervention will be long term, made up of at least 13 sessions, spread across a minimum of 9 months and will expect participants to set and achieve goals and make positive changes to their lifestyle. The sessions will be delivered predominantly in groups and will be 'face-to-face' unless there is a strong rationale for an alternative approach.

In order for Gloucestershire to demonstrate its **readiness for implementing the NHS DPP**, it needs to amongst others:

- Engage primary care effectively
- Have in place registers of high risk patients
- Profile known non-diabetic hyperglycaemia patients on such registers
- Assess the baseline in terms of existing pathways for diabetes prevention and other cross over programmes e.g. weight management programmes (i.e. areas of coverage, commissioned capacity, eligibility criteria, referral routes in)
- Agree a local approach to interface of NDPP pathway with other pathways such e.g. weight management programmes
- Model expected annual referral numbers (to include NHS Health Checks flow)
- Agree and develop approach to generating referrals including resources for this (e.g. case finding through NHS health Checks, existing GP Practice Registers, opportunistically)
- Agree approach and resource for point of care testing if appropriate
- Maximise participation in the National Diabetes Audit to help effectively track outcomes for patients.

It is heartening to note that work is already underway in terms of starting to address some of these issues following the submission of the first draft of Gloucestershire's STP. The CPG would need to take ownership of these issues and ensure they are progressed appropriately and in a timely manner.

4.2.1.1. NHS Health Checks

Every year nationally, the NHS Health Check is expected to amongst other things, help:

- Prevent 4,000 people from developing Type 2 Diabetes
- Detect at least 20,000 cases of Type 2 Diabetes or kidney disease earlier

This service which is commissioned locally by Gloucestershire County Council and delivered through primary care has as its eligible population people aged 40 to 74 years who are not on any disease register. This service is expected to serve as one source of referral for the NHS DPP. For this to be a robust source of case finding, performance of health checks need to be optimal, which is not currently the case. Figure 31 shows relatively good performance in terms of offer of invitations by

South Cotswold, Gloucester and Tewkesbury localities, with much lower rates of completion of the health checks across all localities for 2015/16.

Figure 31: Invitation and Completion of NHS Health Checks in Gloucestershire by GP Locality, 2015/16

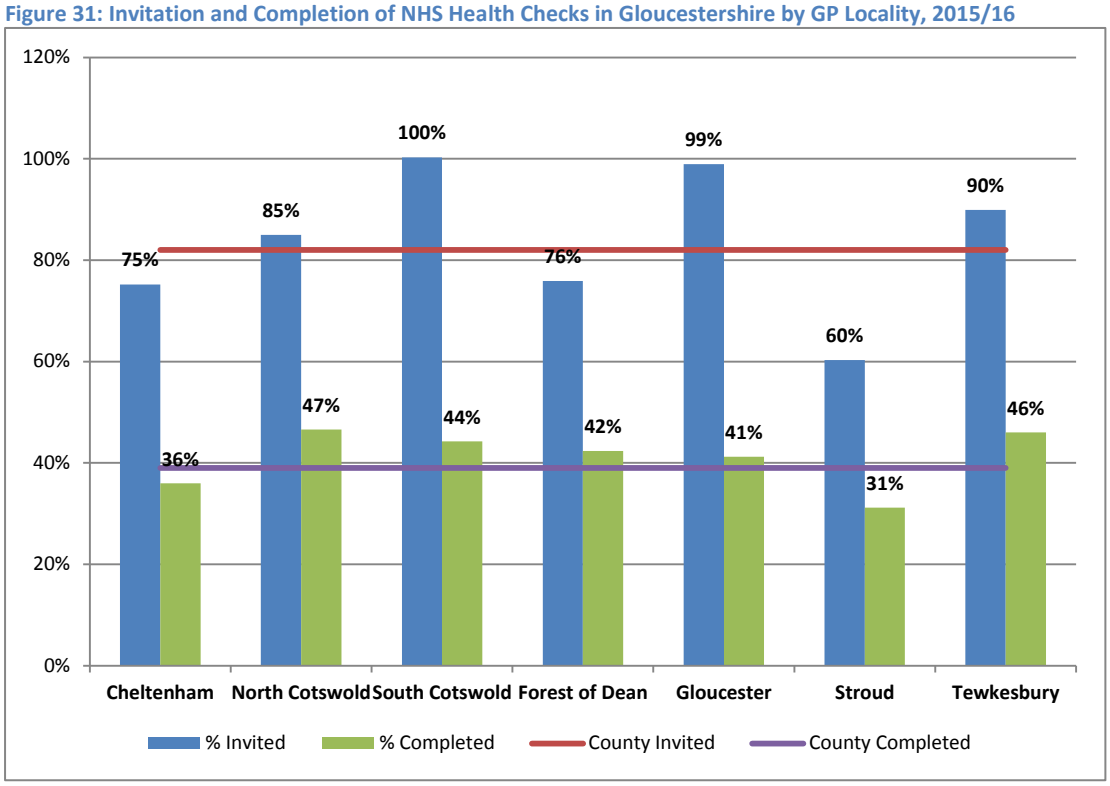


Table 8 shows comparative performance on a cumulative basis. Gloucestershire performs significantly better than regional and national averages in offering Health Checks, but significantly worse in terms of the eligible population actually receiving the checks. It would be helpful to have a good understanding of what might be the barriers to invited people taking up their invitations, as the county needs to see a step change in its eligible population completing their health check.

Table 8: Cumulative Offer and Receipt of NHS Health Checks, 2013/14 to 2015/16

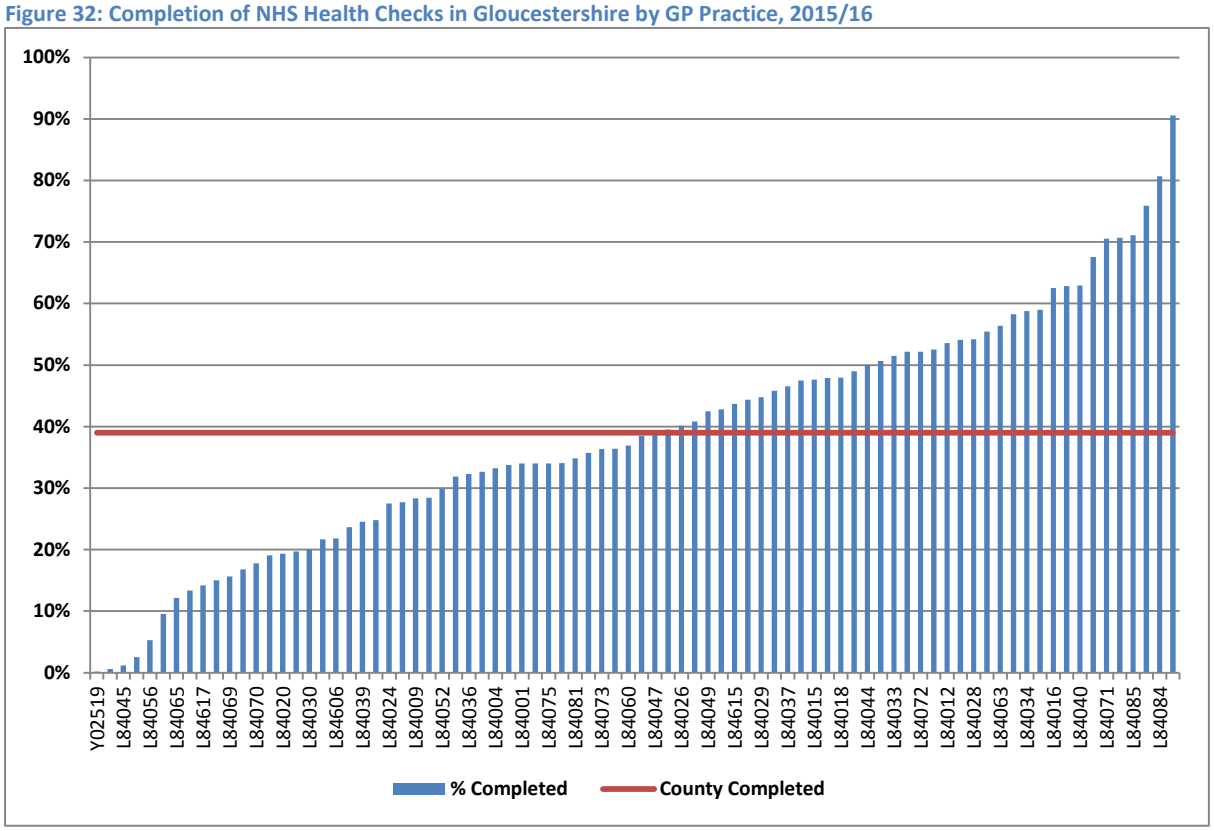
	Gloucestershire	South West	England
Cumulative % of the eligible population aged 40 to 74 offered an NHS Health Check	60.9%	48.8%	56.4%
Cumulative % of the eligible population aged 40 to 74 offered an NHS Health Check who received an NHS Health Check	40.7%	48.2%	48.6%
Cumulative % of the eligible population aged 40 to 74 who received an NHS Health Check	24.8%	23.5%	27.4%

Source: Public Health outcomes Framework

There is a huge variation in the rates of Health Checks completion across GP practices ranging from zero percent to 91%, with an average county rate of 39% in 2015/16 (Figure 32). There needs to be more concerted efforts at completing these checks if this service is to serve as a veritable source of case finding for the NHS DPP locally, especially as an
improved take-up of NHS Health Checks could lead to people at high risk of Type 2 diabetes getting the support for intensive lifestyle behaviour change that can help prevent it. Practices that are more

successful with this are in a good position to help others improve their performance by sharing best practice.

Figure 32: Completion of NHS Health Checks in Gloucestershire by GP Practice, 2015/16



Source: Gloucestershire County Council

A primary care NHS Health Checks audit which is currently under way has the potential to identify people with non-diabetic hyperglycaemia amongst the health check cohort.

The CCG and GCC have started exploring (through their lead officers) how the new Lifestyle Service being procured by GCC would align with any proposed NDPP pathway as well as with the current weight management service procured from Slimming World.

For those who have their disease diagnosed, secondary prevention would be aimed at preventing the development of complications of the disease by optimising glycaemic control, and avoiding or treating coexisting risk factors. This is of huge importance for both adults and CYP. Success would be predicated on patients having the requisite knowledge of their condition and how to manage this successfully in partnership with their clinicians and families and carers, as well as support to enable them do this.

4.3. Tertiary Prevention

This is concerned with the early identification and treatment/management of complications of diabetes to reduce the morbidity and mortality associated with these. These complications are discussed in more detail in section 5.1.4.

Summary

- *Type 1 Diabetes cannot be prevented but there is however a lot of evidence that lifestyle changes can help prevent the development of Type 2 Diabetes. Avoidance of obesity is the major target of primary prevention of Type 2 Diabetes, with this being achieved mainly through increased exercise or restricted calorie intake. Relevant healthy lifestyle messages and interventions should be targeted at people at high risk i.e. those who are aged 40 and above, those who have a family history of the disease, those with low levels of physical activity and those who are overweight. These groups should be considered for prioritisation within the re-procured lifestyle service in the county. Secondary Prevention should focus on the earliest possible identification of the Type 2 Diabetes (e.g. borderline elevations of blood glucose or other markers of risk), with a view to delivering early evidence-based interventions. Tertiary prevention is concerned with the early identification and treatment/management of complications of diabetes to reduce the morbidity and mortality associated with these.*
- *Many people destined to develop Type 2 Diabetes spend many years in a state of prediabetes which a situation where a person's blood glucose levels are higher than normal but not high enough for a diagnosis of Type 2 Diabetes Mellitus. PHE estimates the prevalence of prediabetes in Gloucestershire to be 11.7% i.e. 59,111 people aged 16 years and over – the cohort of people to be targeted should Gloucestershire succeed in its bid to run the* ***NHS Diabetes Prevention Programme – Healthier You.*** *Those referred to the programme will get tailored, personalised help to reduce their risk of Type 2 Diabetes including education on healthy eating and lifestyle, help to lose weight and bespoke physical exercise programmes, all of which together have been proven to reduce the risk of developing the disease. There are a number of steps the county needs to take in readiness for this and the CPG would need to take ownership of these issues and ensure they are progressed appropriately and in a timely manner.*
- *The NHS Health Check is expected to amongst other things, help Prevent 4,000 people from developing Type 2 Diabetes and detect at least 20,000 cases of Type 2 Diabetes or kidney disease earlier, nationally. The service which is commissioned by Gloucestershire County Council is expected to serve as one source of referral for the NHS Diabetes Prevention Programme. Gloucestershire performs significantly better than regional and national averages in offering Health Checks, but significantly worse in terms of the eligible population actually receiving the checks. It would be helpful to have a good understanding of what might be the barriers to invited people taking up their invitations, as more concerted efforts need to be deployed at completing these checks if this service is to serve as a veritable source of case finding for the NHS DPP locally. Improved take-up of NHS Health Checks could lead to people at high risk of Type 2 diabetes (in the eligible group) getting the support for intensive lifestyle behaviour change that can help prevent it even in the absence of NHS DPP*

5. Services and Care for Diabetes

Everyone with Diabetes who is aged 12 years and over should receive all of the nine NICE-recommended care processes and attend a structured education programme when diagnosed. These annual care processes which should be delivered by Diabetes care providers are:

1. Blood test for glucose control (HbA1c)
2. Measurement for cardiovascular risk (blood pressure)
3. Blood test for cardiovascular risk (serum cholesterol)
4. Blood test for kidney function (serum creatinine)
5. Urine test for kidney function (urine albumin/creatinine ratio)
6. Foot examination for foot ulcer risk (foot risk surveillance)
7. Measurement for cardiovascular risk (body mass index – BMI)
8. Question for cardiovascular risk (smoking history)

The **ninth care process** which is the responsibility of the NHS **Diabetes Eye Screening Service** is photographic eye test for eye risk.

5.1. Service Delivery

5.1.1. Primary Care Services

General Practices are paid according to the needs of their patients and the costs of providing primary care services which are defined as “essential” and “additional” services in the General Medical Services (GMS) contract. **Practices are required to provide essential services** which cover the:

- Management of patients who are ill or believe themselves to be ill with conditions from which recovery is generally expected
- General management of patients who are terminally ill
- Management of chronic disease

Practices also have a preferential right to provide **additional services**, and they normally do. These services cover:

- Cervical screening
- Contraceptive services
- Vaccinations and immunisations
- Child health surveillance
- Maternity services

5.1.1.1. General Diabetic Care

General diabetic care would be delivered mainly under essential services, but can also be under additional services (e.g. vaccinations and immunisations for patients with Diabetes). The provision of such care (supported by the Community Diabetes Team) covers everyone with Diabetes **with the exception of:**

- Type 1 Diabetes
- Inpatient diabetes care/services

- Patients on insulin pumps
- Specialist nephropathy and/or receiving dialysis
- Specialist diabetic footcare
- Specialist antenatal diabetic care i.e. women with Diabetes contemplating pregnancy or women with Diabetes who are pregnant.

General diabetes care is available across the county through the 84 GP Practices.

5.1.1.2. Community Enhanced Service

This service which covers **enhanced** aspects of care of diabetic patients in GP Practices (i.e. beyond the scope of essential[53] or additional[54] General Medical Services) is in its second phase in the county. The aims of the service are to:

- Support **the improvement of diabetes knowledge and skills** within practice healthcare teams
- **Reduce variation in the quality of diabetes care** provided across primary care
- **Minimise referrals of patients** to hospital/acute-based services who could be managed in primary and community care i.e. provide non-complex diabetes care in a non-acute setting
- **Repatriate** eligible (stable and non-complex) patients from long-term follow-up in secondary care i.e. those that require generalist/non-specialist care

The enhanced service is available at two levels:

- Level 1
    - Identification of lead GP and Practice Nurse
    - Active engagement with the Community Diabetes Service
    - Timely referral for patient education
    - Completion of 8 NICE Care Processes for 70% of Diabetes patients
    - General Diabetes care
    - Repatriation of stable Type 2 Diabetes patients being followed up in hospital
    - Review of unplanned admissions
    - Attendance at Community Diabetes Team training events
- Level 2 (in addition to components of level 1):
    - Initiation of injectable therapies (insulin, GLP-1 Analogues)

It is also hoped that this service would lead to reduction in hospital outpatient referrals and follow-up visits. This needs to be explored with the Information Team

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[53] Essential services include:
a. The management of patients who are ill or believe themselves to be ill, with conditions from which recovery is generally expected, for the duration of that condition, including relevant health promotion advice and referral as appropriate, reflecting patient choice wherever practicable.
b. General management of patients who are terminally ill
c. Management of chronic disease in the manner determined by the practice, in discussion with the patient

[54] Additional services are defined as: Cervical Screening, Contraceptive Services, Vaccinations and Immunisations, Childhood Vaccinations and Immunisations, Child Health Surveillance, Maternity Medical Services, Minor Surgery, Out of Hours Services

Though performance was better than national averages, Gloucestershire witnessed a decrease in terms of the proportion of people with Diabetes who completed the **eight care processes** from 2013/14 to 2014/15 (Table 9). There has also been decreased participation of GP Practices in the National Diabetes Audit over recent years, a situation which is currently hopefully being reversed.

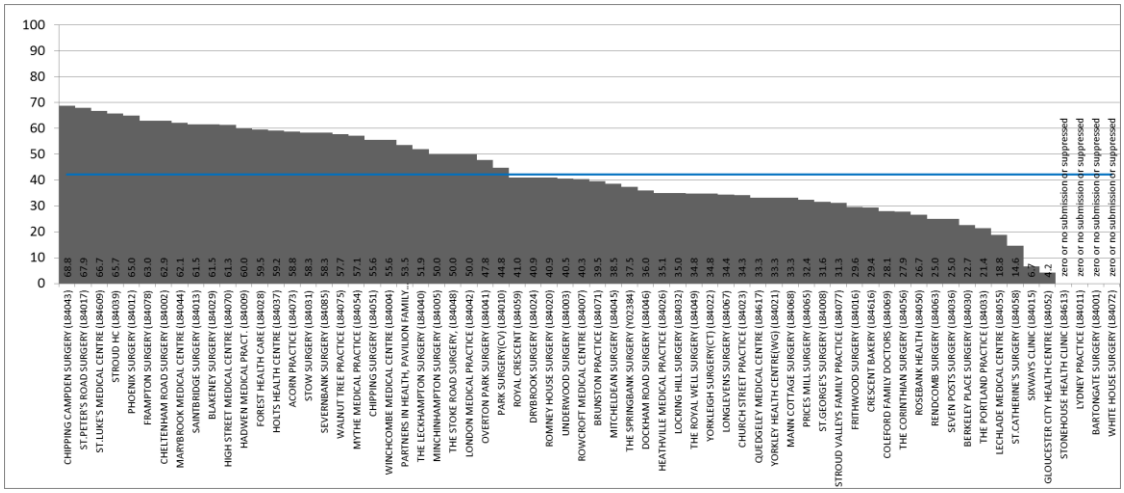
Table 9: Proportion of People with Diabetes who completed the Eight Care Processes Gloucestershire, 2013/14 to 2014/15

	Type 1 Diabetes		Type 2 Diabetes	
	2013/14	**2014/15**	**2013/14**	**2014/15**
Gloucestershire	47%	42.1%	71.1%	65.1%
England	45.2%	39.6%	67.9%	59%

Source: National Diabetes Audit

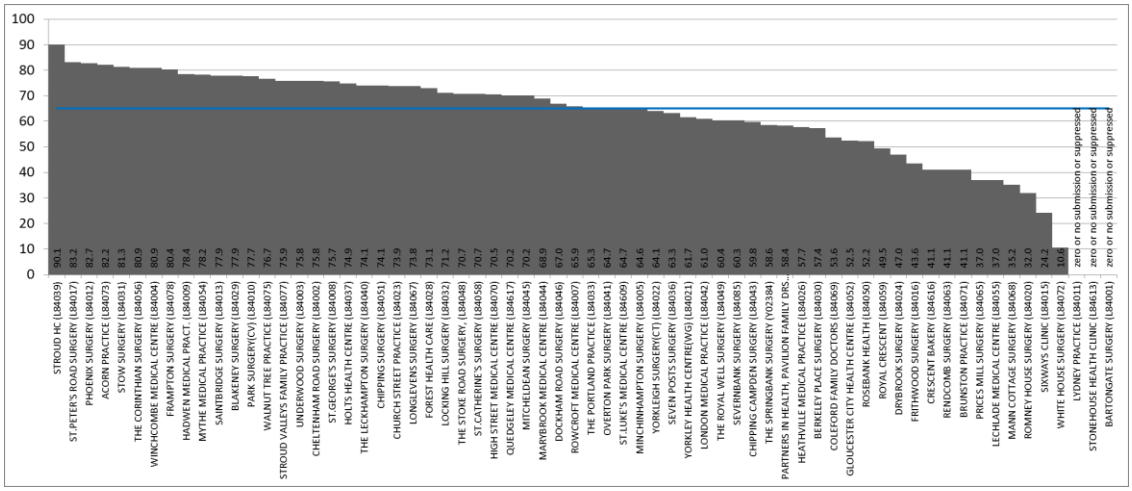
GP Practices showed **huge unwarranted variation** in completion of these care processes in 2014/15 ranging from 4.2% to 68.8% for Type 1 Diabetes (Figure 33) and from 10.6% to 90.1% for Type 2 Diabetes patients (Figure 34).

Figure 33: Percentage of People with Type 1 Diabetes Receiving the Eight Care Process in Gloucestershire in 2014/15 by GP Practice



Source: National Diabetes Audit

Figure 34: Percentage of People with Type 2 Diabetes Receiving the Eight Care Process in Gloucestershire in 2014/15 by GP Practice



Source: National Diabetes Audit

There variations suggest that the aim of the CES is not being met and an evaluation of the returns from GP Practices signed up to the CES should be conducted to ensure the expenditure results in improved outcomes for patients.

All but seven GP practices[55] were signed up to delivering this CES as of July 2016. One of these practices has prevalence rates that have been consistently above the county and England average. It would be good to explore what the current performance of this particular practice is (if not the seven) in relation to the care processes and outcomes for its diabetic patients given its large cohort. Five of these practices perform lower than the county average in terms of referral of newly diagnosed patients to education programmes within nine months, whilst Flu vaccination coverage in four of the practices is also lower than county average.

5.1.2. Community Specialist Service

The community diabetes service (CDT) which is provided by Gloucestershire Care Services NHS Trust is made up of a team of specialist nurses, dieticians and a GP with a special interest in Diabetes. Specially trained nurses also deliver patient education sessions. The uptake of the education sessions (DESMOND) had not been optimal in the past which has led to a change in the education offer (see below)

The service supports people with **Type 2 Diabetes** (aged 18 years and over)in managing their condition especially those:

- In which there is a concern that their long-term blood glucose control is too high
- Who might need a new form of diabetes medication
- Who might be experiencing repeated episodes of low blood glucose
- Who may need help altering their diet to control their blood glucose

[55] 2 in Cheltenham Locality, 2 in Forest of Dean Locality and 3 in Gloucester Locality

The service is delivered through community clinics throughout Gloucestershire, home visits to the housebound or nursing home patients. The team is also able to see patients at their own surgeries when appropriate.

Community clinics are held in Gloucester, Cheltenham, Stroud, Dursley, Forest of Dean, Cirencester, Tetbury and North Cotswold, which suggests an equitable availability of this service across the county.

In commissioning the CDT service, the CCG was aiming at ensuring improved outcomes and reduced complications for people with Diabetes; improved experience of diabetic care and close working with primary care healthcare teams.

The initial high-level objectives set were:

- Improved patients experience (including increased confidence around self-management)
- Reduction in variation across primary care
- Reduction in unplanned admissions
- Reduction in readmissions
- Reduction in length of stay where appropriate
- Reduction in acute first out-patient follow-up appointments
- Reduction in mortality rates
- Delivery of integrated Diabetes care across primary, community and acute providers
- Improved/increased medicines optimisation

The CDT has more recently been re-designated and oriented to provide a fully primary care-facing and supporting service which includes:

- The development of a rolling programme of education and support to primary care healthcare teams
- Provision of practical advice and support to assist practices with more complex patients (this includes the provision of virtual/joint clinics, mentoring, phone/e-mail advice etc.)
- The closer integration with community diabetes podiatry services to provide a more comprehensive multi-disciplinary team approach and service
- The development and modification of the patient education programme offering increased choice and increased access resulting to enhance uptake and outcomes. The three programmes on offer are detailed below.
- Strong links with the acute specialist diabetes team including planned medical professional oversight by the GHNHSFT lead diabetologist

It is recommended that the CPG continues to monitor and evaluate how well the service is meeting these set objectives.

5.1.2.1. Patient Education Programme

5.1.2.1.1. Diabetes and You

This is a three-hour session led by a nurse or dietician which is intended for anyone with Type 2 Diabetes or carers, regardless of length of diagnosis. Topics covered include:

- What diabetes is
- How it may affect long-term health
- Some of the treatments that are available
- How the healthcare team can support the patient to manage their diabetes
- Understanding what some of the blood tests and annual checks are for
- Brief overview of healthy eating and activity

5.1.2.1.2. Diabetes, Food and You

This is a three-hour session led by a dietician who specialises in diabetes. It is intended for anyone with Type 2 Diabetes or carers, regardless of length of diagnosis. The session which is activity and discussion-based aims to ensure that the patient gets practical advice they can relate to. The main topics covered during the session are:

- Foods which do and don't impact on blood glucose control
- Myths and facts about diet and diabetes
- Carbohydrates and fat
- Food labelling
- Healthy food swaps
- Tips on how to lose weight
- Eating out and alcohol

5.1.2.1.3. Diabetes, Insulin and You

This is a three-hour session led by a diabetes specialist nurse designed for patients with Type 2 Diabetes who have recently started insulin or who are already on insulin and would like an update.

The session covers topics such as:

- What insulin is and why is it needed
- Differences between the various insulins available
- Blood glucose testing
- Injection technique
- Hypoglycaemia – causes, symptoms and how to treat
- Diabetes and driving
- Insulin dose adjustment

Patients are expected to have attended the 'Diabetes and You' session before attending either the 'Diabetes, Food and You' or the 'Diabetes, Insulin and You' sessions.

Though records of referral to structured education being offered within one year of diagnosis is relatively high nationally, attendances at such education sessions are much lower and have only increased marginally over the years. Referrals to such sessions in Gloucestershire which are detailed in Figure 35 have decreased in recent years, though still higher than national average

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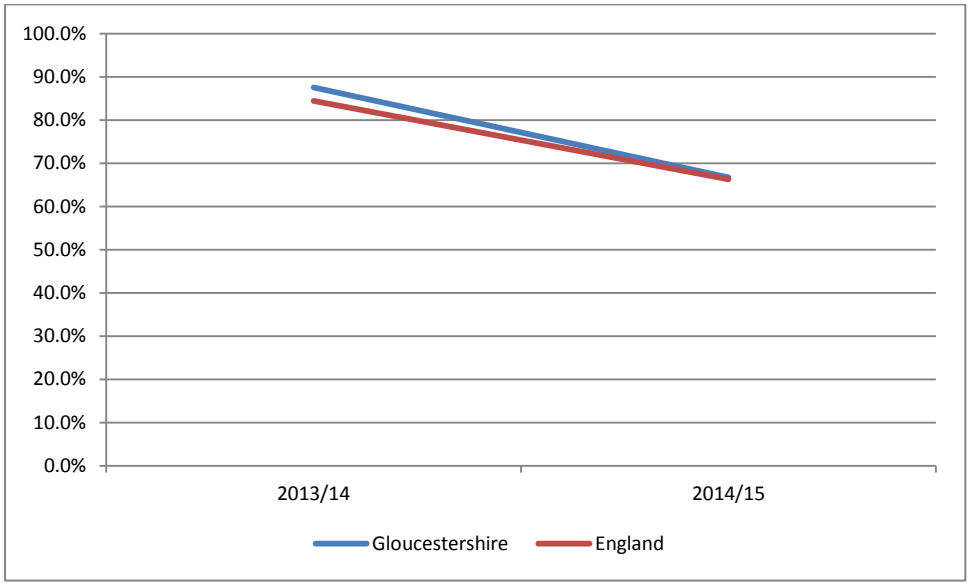
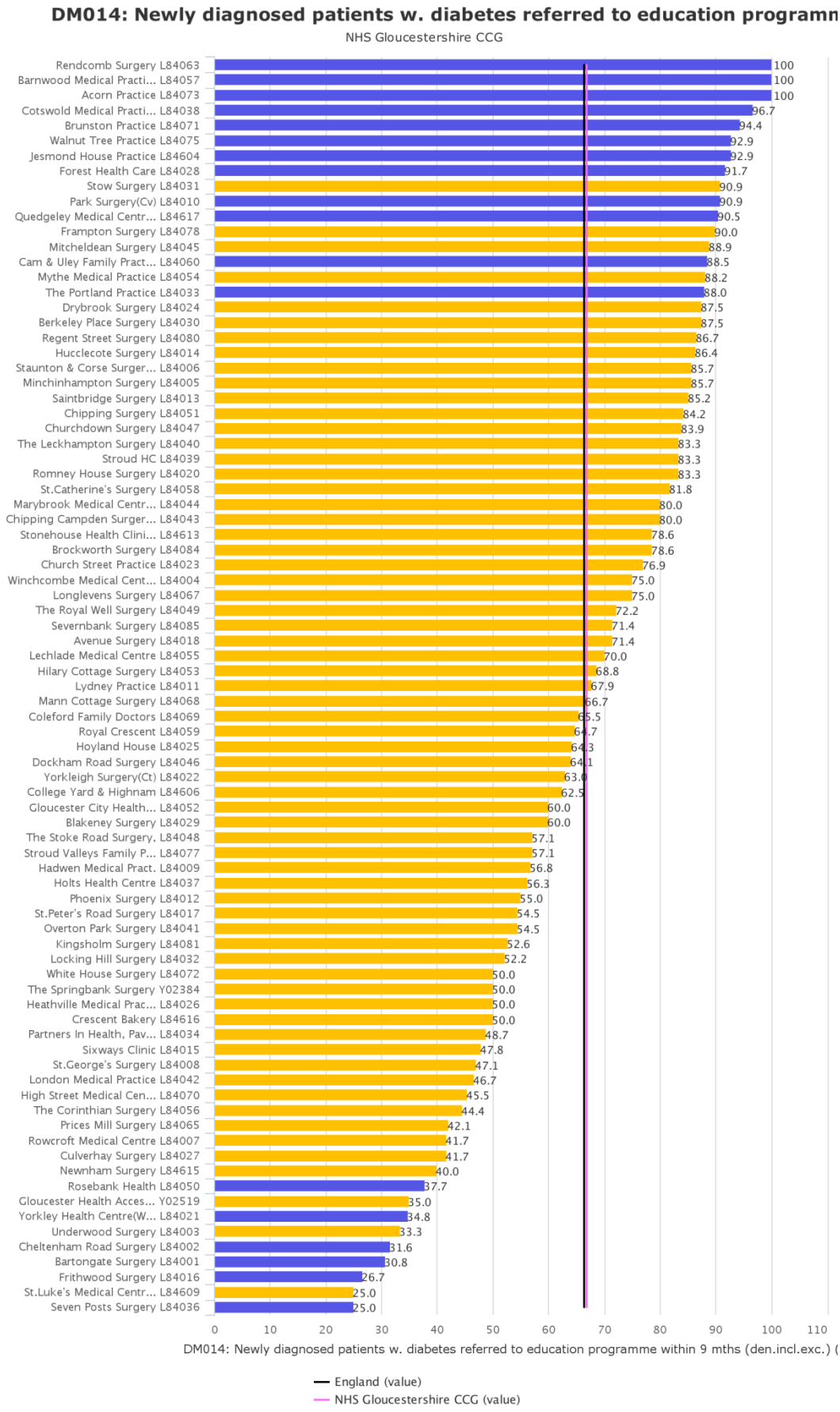
Figure 35: Newly Diagnosed Patients with Diabetes Referred to Education Programme within Nine Months, 2013/14 and 2014/15



Source: National GP Profiles

Figure 36 shows that 40 GP Practices have referral which are lower than the county average whilst 6 Practices (three in Gloucester Locality) have referrals **significantly lower** than the national average and 12 with **significantly higher rates** (three of which had 100% referrals) in 2014/15.

Figure 36: Newly Diagnosed Patients with Diabetes Referred to Education Programme within Nine Months



Feedback from the CDT is that their education sessions have enjoyed huge engagement from patients with the effort in sustaining this now having the potential to reduce available capacity within the team to optimally provide other support services to primary care. The success of this needs however to be explored in terms of measurable improvement in the county's performance around referral to, and indeed attendance at structured education (one of the measures in the new CCG Improvement and Assessment Framework), with a particular focus on addressing the variation across GP Practices including those with high prevalence rates of Diabetes.

5.1.3. Secondary Care

Gloucestershire Hospitals NHS Foundation Trust provides secondary care for patients with Diabetes Mellitus. The Trust's Diabetic Medicine Department provides the following service:

- Outpatient services
    - General diabetes
    - Young adult diabetes (16 to 21 year olds)
    - Diabetes-podiatry clinics
    - Antenatal diabetes clinics
    - Diabetes assessment
- Inpatient services at Cheltenham General Hospital and Gloucestershire Royal Hospital

5.1.3.1. Adult Services – Outpatient Services

General Diabetes Clinic

Clinics are held throughout the week at both hospitals and several times a month at various community hospitals. The referral criteria for this clinic are:

- All patients with Type 1 Diabetes
- Patients with Type 2 Diabetes with poor control or complications
- Any patient where the type of diabetes is uncertain at diagnosis (e.g. possible MODY)
- Secondary diabetes (e.g. cystic fibrosis-related)

Young Adult Clinic

Clinics are held monthly on a Friday afternoon at Gloucestershire Royal Hospital and quarterly at Cheltenham General Hospital with Diabetes Specialist Nurses and a Dietician also present. Transition clinics are held on demand with members of the paediatric diabetes team. It would be good to explore how well the transition CQUIN is working for young people with Diabetes especially when considering the potential significant changes to be faced by young people with Type 1 Diabetes going on to adult services. NICE reckons that maintenance of motivation in young people around management of their condition is core to a successful transition.

Joint Diabetes/Renal Clinic

Clinics are held monthly on a third Friday afternoon at Gloucestershire Royal Hospital and fourth Friday afternoon at Cheltenham General Hospital. Diabetes Specialist Nurses, Dieticians (and Pharmacist - GRH only) are also present

Insulin Pump Clinic

Clinics are held on Monday mornings of weeks 1, 3 and 4. Insulin Pump Consultant, Diabetes Specialist Nurse and a Dietician are present.

Antenatal Clinic

Clinics are held every Monday morning in the Women's Centre. A Diabetes Specialist Nurse and Dietician are also present. Patients will usually be seen within that week. The referral criteria are:

- All patients with diabetes at the point their pregnancy is confirmed
- All patients undergoing active treatment for Graves' disease, prolactinomas and other endocrine conditions which may alter in pregnancy

A 'service walkthrough' of Diabetic services in GRH provided an opportunity to have a first hand experience of delivery of diabetic services. This visited showed a team with a strong focus on person-centred care and good relationships with Paediatrics (supported by a CQUIN for transition which is currently in place) and the Diabetic Eye Screening Service

5.1.3.2. Adult Services – Staffing

Table 10 shows the **structure of staffing** for both inpatient and outpatient care. Specialist diabetes nursing provision is below England average on both hospital sites especially in CGH. This low provision is important especially when viewed against the backdrop of clinical studies which suggest that specialist diabetes inpatient teams can reduce prescribing errors (which seems to be a local issue - see section 5.1.3.3.2.); improve patient outcomes; reduce length of stay; increase day case rates and reduce the number of admissions[56]. During the service walkthrough, a national shortage of specialist diabetes nurses was highlighted, as well as the local loss of a number of experienced diabetes nurses in the past 12 months. Efforts would need to be directed at rectifying this with appropriate support from the CCG given that economic modelling suggests that savings from introducing specialist inpatient teams can substantially outweigh any associated costs.

Consultant time seems to be below England average in GRH, while dietician provision appears to be above the national average.

Table 10: Average Staffing for the Care of People with Diabetes in GHNHSFT ((Total Team Hours Spent on Inpatient and Outpatient Care) compared with National Average, 2015

	Cheltenham General Hospital	Gloucestershire Royal Hospital
Average diabetes specialist nursing hours per week per patient	Quartile 1 (0.77 vs 1.58)	Quartile 2 (1.42 vs 1.58)
Average consultant hours per week per patient	Quartile 3 (0.74 vs 0.71)	Quartile 3 (0.66 vs 0.71)
Average dietician hours per week per patient	Quartile 4 (0.81 vs 0.47)	Quartile 4 (0.78 vs 0.47)

Source: National Diabetes Inpatient Audit 2015

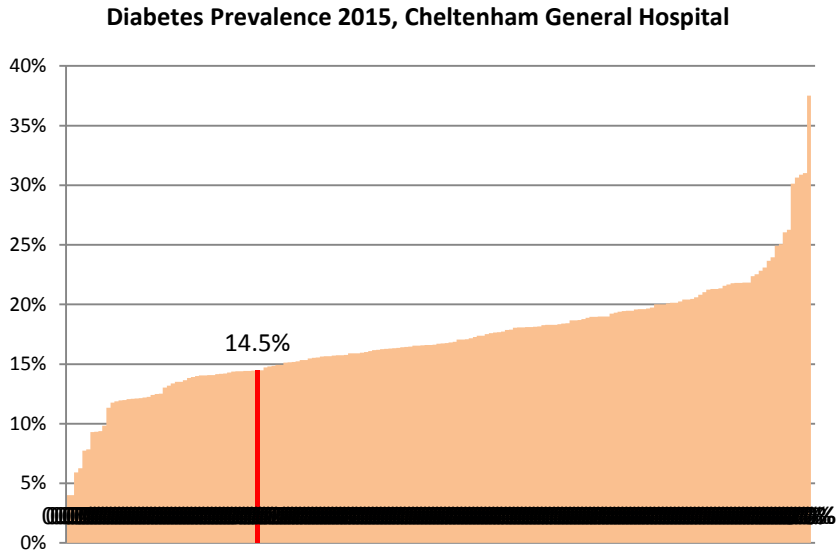
[56] Diabetes UK. (2014). Cost of Diabetes Report. https://www.diabetes.org.uk/Documents/Diabetes%20UK%20Cost%20of%20Diabetes%20Report.pdf

The 2015 audit showed there was no provision of Podiatrist Care nor specialist pharmacist care in either of the hospitals. The issue of hospital-based podiatrist care is currently being taken forward in the county, whilst specialist pharmacist support can help with prescribing errors.

5.1.3.3. Adult Services - Inpatient services

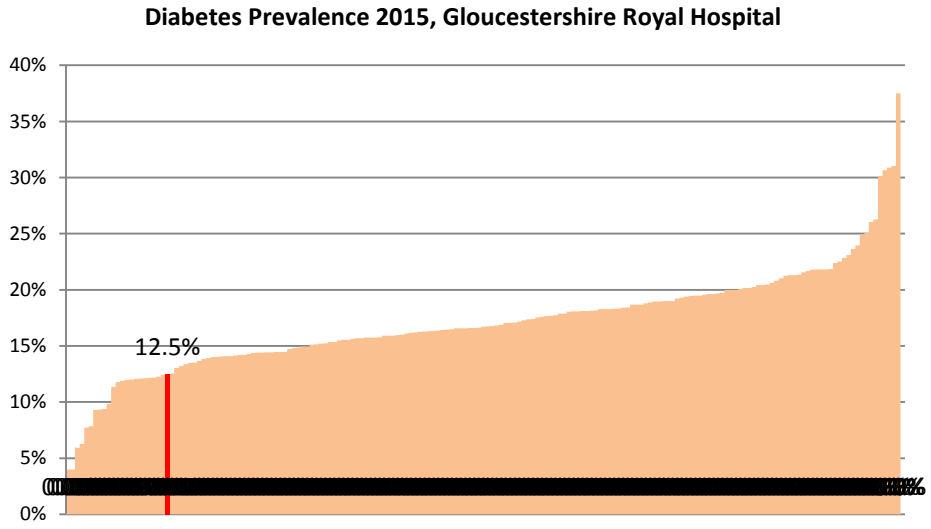
These are available in its two hospitals (Cheltenham General and Gloucestershire Royal Hospitals). The 2015 National Diabetes Inpatient Audit identified 47 inpatients with diabetes at Cheltenham General Hospital, which places the hospital in Quartile 2 in terms of prevalence nationally (Figure 37) at 14.5% of beds audited. For Gloucestershire Royal Hospital, there were 67 inpatients with diabetes which places Gloucestershire Royal Hospital in Quartile 1nationally (Figure 38) at 12.5% of beds audited.

Figure 37: Inpatient with Diabetes 2015, Cheltenham General Hospital.



Source: National Diabetes Inpatient Audit 2015

Figure 38: Inpatient with Diabetes 2015, Gloucestershire Royal Hospital



Source: National Diabetes Inpatient Audit 2015

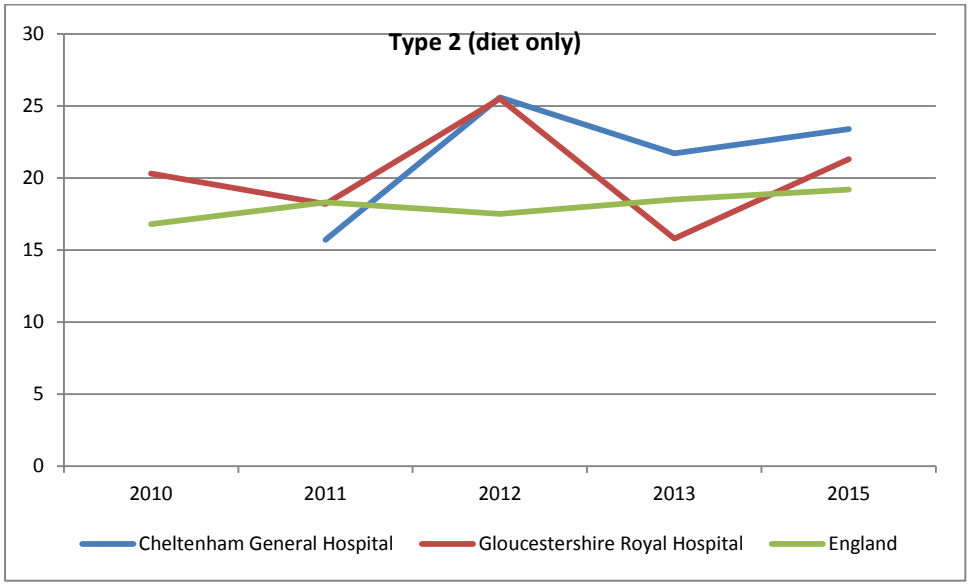
The trend in prevalence in both hospitals has been below national average and in the lower quartiles over the years (2010 to 2015), whilst the national prevalence of diabetes amongst hospital inpatients has increased every year since audit inception, from 14.6 per cent to 16.8 per cent.

In terms of the types of Diabetes treated in hospital in 2015, the greatest proportion (at least 4 in 10) was Type 2 Diabetes (non-insulin) with the distribution of the types in line with the national picture as follows:

- Type 1 (GRH 9.8%, CGH 2.1%)
- Type 2 -insulin (GRH 24.6%, CGH 29.8%)
- Type 2 – non insulin (GRH 44.3%, CGH 42.6%)
- Type 2 – diet only (GRH 21.3% CGH 23.4%)
- Other type (GRH 0% CGH 2.1%)

About a quarter to a third of patients had Type 2 (insulin), while the proportion of inpatients with Type 2 (diet only) was higher in both hospitals than the England average in 2015. This might point to issues around consistent and appropriate dietary support in the community. Figure 39 shows the trend from 2010 to 2015 (no audit data available for 2014).

Figure 39: Inpatients with Diabetes Type 2 (diet only) in Gloucestershire, 2010 to 2015



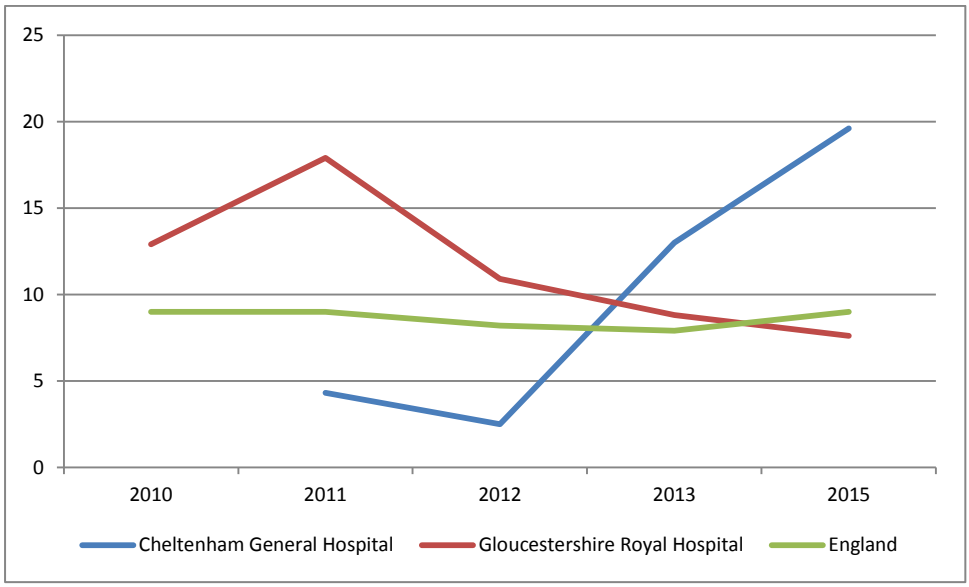
Source: National Diabetes Inpatient Audit 2015

Type 2 (insulin) – the proportion in both hospitals has decreased from above national average in 2013 to similar to national average in 2015. The opposite is true for Type 2 (non-insulin) where the proportion moved from below national average in 2013 to similar to national average in 2015. The data suggest that there is scope to explore how well the Diabetes Community Specialist team are able to support the Type 2 patients in the community, and what further support they may need to improve on this, thereby helping to decrease the proportion of inpatients with Type 2 managed on medications and diet alone.

It is however instructive to note that only 7.6% of inpatients with diabetes in GRH in 2015 were admitted for management of Diabetes specifically (19.6% in CGH) with more than three quarters

(78.8%) for other medical conditions (58.7% in CGH). Figure 40 shows the proportion of inpatients with Diabetes admitted specifically for the management of Diabetes has remained relatively stable national, decreased in GRH whilst there has been an increasing in CGH. This is worth exploring. Nationally, inpatients with Type 1 Diabetes were significantly more likely to be admitted for the management of their Diabetes or Diabetes complications than inpatients with Type 2 Diabetes treated with insulin or any other Diabetes type.

Figure 40: Admissions for Management of Diabetes in Gloucestershire, 2010 - 2015

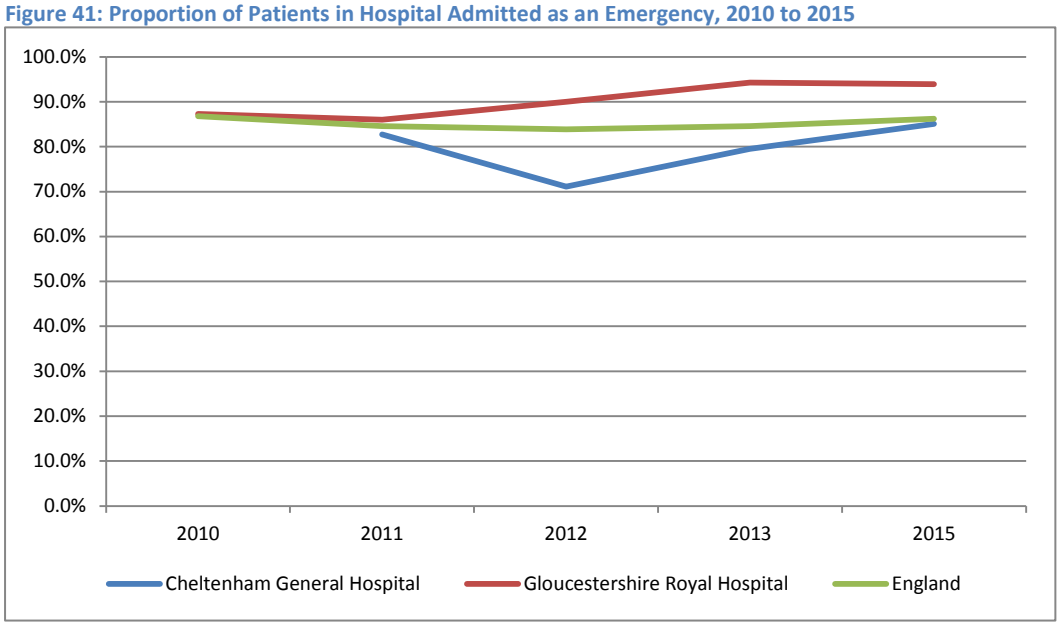


For inpatient who were admitted for the management of diabetes or a diabetes complication nationally in 2015, almost half (49 per cent) were admitted for active foot disease (for both Type 1 and Type 2), whilst diabetic ketoacidosis (DKA) predominated for inpatients with Type 1 Diabetes (46 per cent).

5.1.3.3.1. Emergency Admissions

People with diabetes are more likely to be admitted as an emergency compared to all inpatients in hospital. In 2015, the proportion of inpatients with Diabetes admitted to GRH as an emergency was above the England average and in the highest quartile nationally. Figure 41 which details the trend in both hospitals shows that GRH has consistently had a higher than average proportion of admissions as emergencies. Though the proportion in CGH has generally been below average, this has also been increasing over the years. An understanding of what constitutes these admissions from the catchment areas would be necessary to reduce these rates by providing appropriate support outside hospital.

Figure 41: Proportion of Patients in Hospital Admitted as an Emergency, 2010 to 2015



Source: National Diabetes Inpatient Audit 2015

Table 11 shows emergency admissions by GP localities. The comparatively high numbers from Gloucester locality may be understandable given that the locality has a higher than county average prevalence (QoF) of Diabetes. It is also a catchment area for GRH. It is however interesting to note that Forest Locality which also has a higher than average prevalence has fewer numbers of emergency admissions, which suggests the locality may be managing their patients better. It is also instructive to note that S&BV Locality which has a lower than average prevalence has emergency admission numbers higher than those of Forest. This may indicate that there is need for a focus on this locality in terms of appropriate management in the community.

Table 11: Emergency Admissions, All Providers, by Locality, 2013/14 to 2015/16

	2013/14	2014/15	2015/16
Cheltenham	85	98	71
Forest	32	49	27
Gloucester City	122	100	106
North Cotswold	8	16	17
South Cotswold	25	32	34
Stroud & Berkeley Vale	46	55	50
Tewkesbury	26	32	27
Blank	13	13	3
Total	357	395	335

Source: CCG Information Team

Table 12 shows the top five reasons for emergency admissions in Gloucestershire over a period of three years. Ketoacidosis in patients with insulin-dependent Diabetes has the most number of admissions (about third of all emergency admissions), whilst a significant number of people with insulin dependent Diabetes without complications (19%) and noninsulin-dependent Diabetes without any complications (22%) were also admitted as emergencies in 2015. These admissions show how important the optimal management of diabetes (especially insulin-dependent ones) is outside hospital.

Table 12: Causes of Diabetic Emergency Admissions in Gloucestershire, All Providers, 2013/14 – 2015/16

	2013/14	2014/15	2015/16
Insulin dependent Diabetes with ketoacidosis	120	155	110
Insulin dependent Diabetes without complications	92	89	64
Non insulin dependent Diabetes without complications	62	65	74
Non insulin dependent Diabetes with peripheral circulatory complications	30	31	35
Non insulin dependent Diabetes with ketoacidosis	19	36	18

Source: CCG Information Team

Diabetic ketoacidosis (DKA) is a potentially life-threatening condition which results from a lack of insulin and is therefore most common in people with Type1 Diabetes, though anyone who depends on insulin could develop diabetic ketoacidosis. Knowledge of the most likely times for DKA to occur (listed below) should help health professionals maintain a high level of suspicion:

- At diagnosis.
- When patients are ill.
- During a growth spurt/puberty.
- When patients have not been taking their insulin for any reason.

Table 13 shows details of emergency admissions and bed days across all providers for Gloucestershire patients. The general increase in excess bed days over this time period is an area worth exploring in terms of its potential for cost reduction given the fact that excess inpatient days are the second highest source of cost for diabetic care[57].

Table 13: Diabetes Emergency Admissions (All Providers), 2013/14 to 2015/16

	Emergency Admissions	Bed Days	Average Length of Stay	Excess Bed Days
2013/14	357	169	4.7	89
2014/15	395	2196	5.6	143
2015/16	335	1809	5.4	132

Source: CCG Information Team

Table 14 shows that excess bed days is a particular issue with Gloucester City Locality in terms of trend, with Forest Locality also showing an increasing trend.

Table 14: Excess Bed Days (Emergency Admissions), All Providers, by Locality, 2013/14 to 2015/16

	Cheltenham	Forest	Gloucester City	North Cotswold	South Cotswold	Stroud & Berkeley Vale	Tewkesbury	County
2013/14	34	0	38	0	0	6	11	89
2014/15	14	10	42	1	9	23	44	143
2015/16	26	15	74	1	3	9	4	132

Source: CCG Information Team

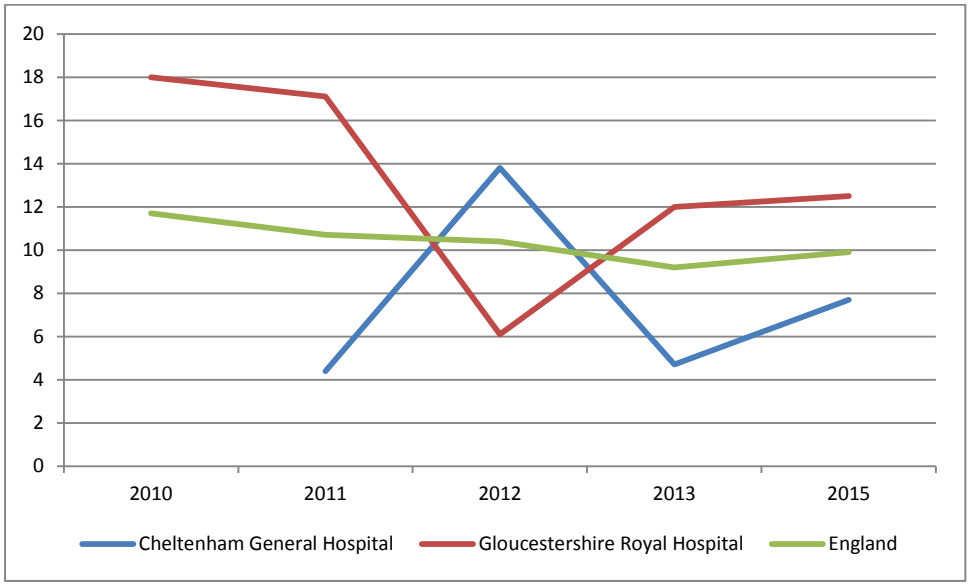
[57] Diabetes UK: The cost of diabetes report

5.1.3.3.2. Complications while on Admission

The 2015 National Diabetes Inpatient Audit showed that CGH had a higher proportion of mild hypoglycaemic episodes[58] among Diabetic inpatients compared with the England average, whilst

GRH had a higher proportion of severe hypoglycaemic episodes[59], (quartile 3) with this being generally higher than national average over the years, except for 2012 (Figure 42). Though the trend is in a downward direction (in line with the experience nationally), more concerted efforts are need to bring this below the national average. Focus may be given to the management of Type 1 Diabetes given that this is the only type that has not shown a reduction in hypoglycaemic episodes in general nationally since 2010. More recently since 2013 however, the prevalence of hypoglycaemic episodes in inpatients with Type 2 insulin treated Diabetes has increased nationally.

Figure 42: Severe Hypoglycaemic Episodes in Inpatients with Diabetes in Gloucestershire, 2010 - 2015



Source: National Diabetes Inpatient Audit 2015

Nationally, inpatients with Type 1 Diabetes were most likely to experience one or more mild hypoglycaemic episodes (42.5 per cent) or severe hypoglycaemic episodes (31.3 per cent). Hypoglycaemic episodes are avoidable and they should be a rare occurrence in a hospital setting.

The use of insulin infusion[60] was higher in both hospitals than England average, whilst its use was found to be inappropriate in about 43% of patients in GRH (which might have been responsible for the higher rate of severe hyperglycaemia). This is an area to explore further especially given its magnitude as well as this occurring following a number of years of appropriate use in the past.

Medication errors[61], prescription errors and insulin errors[62] were all found to be higher in both hospitals (all in the highest quartile) than the England average. The performances in these areas

[58] Capillary blood glucose of 3.0 – 3.9 mmol/L
[59] Capillary blood glucose of less than 3.0 mmol/L
[60] Insulin infusions are used over a short period of time, generally seven days or less, as an alternative or supplement to subcutaneous injections of insulin or tablets with the aim of achieving safe insulin management during fasting/nil by mouth or to maintain glucose control during severe illness.
[61] Prescription and or management error

have been largely in the highest quartile over the years, and would therefore benefit from further exploration, especially as the 2015 audit found that nationally, inpatients whose drug charts had one or more medication error were more than twice as likely to experience a severe hypoglycaemic episode compared to inpatients whose drug charts had no medication errors, with this effect appearing to be most pronounced for Type 2 non-insulin treated inpatients. Nationally, medication errors have reduced for all Diabetes types over the years. Management errors have however not reduced to the same extent as other error types (medication and prescription): improvement is evident for inpatients with Type 2 non-insulin treated Diabetes, while errors have increased for those with Type 2 insulin treated Diabetes. Since 2010, medication errors and prescription errors were found to be more prevalence on surgical wards compared with medical wards, suggesting where to focus remedial actions on locally in the first instance.

5.1.3.4. Children's Services

These services which consist of both hospital and community-based services for children and neonates across the country are made up of:

- Children's inpatient and outpatient care
- Neonatal Unit based at Gloucestershire Royal Hospital
- Specialist nursing service
- Community Paediatric Medical Team

The **Children's Centre** and specialist children's staff are based at GRH. Minor injuries may be treated at either Cheltenham or Gloucester. The Children's Centre which is a purpose built unit at GRH provides both inpatient and out patient care. An adolescent service is provided from a designated area within the centre.

Outpatient services are provided by two departments, one at CGH and the other at GRH within the Children's Centre. These services treat a wide range of conditions including Diabetes, and they also include specialist nurse-led clinics for Diabetes.

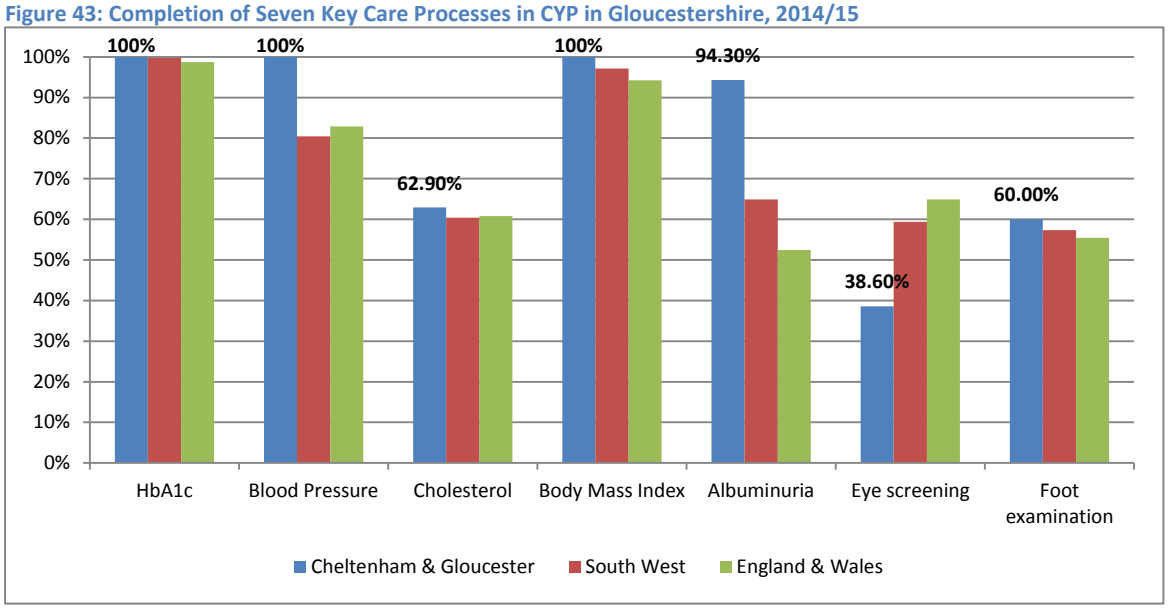
Urgent assessment is provided within the **Paediatric Assessment Unit** (PAU) which is open from 8am until 10pm, Monday to Friday and 9am – 9.30pm at the weekend. The PAU enables rapid senior medical and nursing assessment of children who are referred by GPs, the Emergency Department (A&E), Community Paediatricians as well as Paediatric Outreach Nurses.

The **Paediatric Day Unit** (PDU) which is staffed by specialist Paediatric Nurses and located in the Children's Centre in GRH, cares for children and young people (up to 16 years of age), who require day case surgery and day case medical procedures and investigations.

Figure 43 shows Gloucestershire's relative performance in terms of the seven key care processes for CYP. The county does well with all care processes except with eye screening where only 38.6% had received screening which was way below the regional (59.4%) and national (64.9%) averages.

[62] Insulin prescription errors and/or insulin management errors

Figure 43: Completion of Seven Key Care Processes in CYP in Gloucestershire, 2014/15

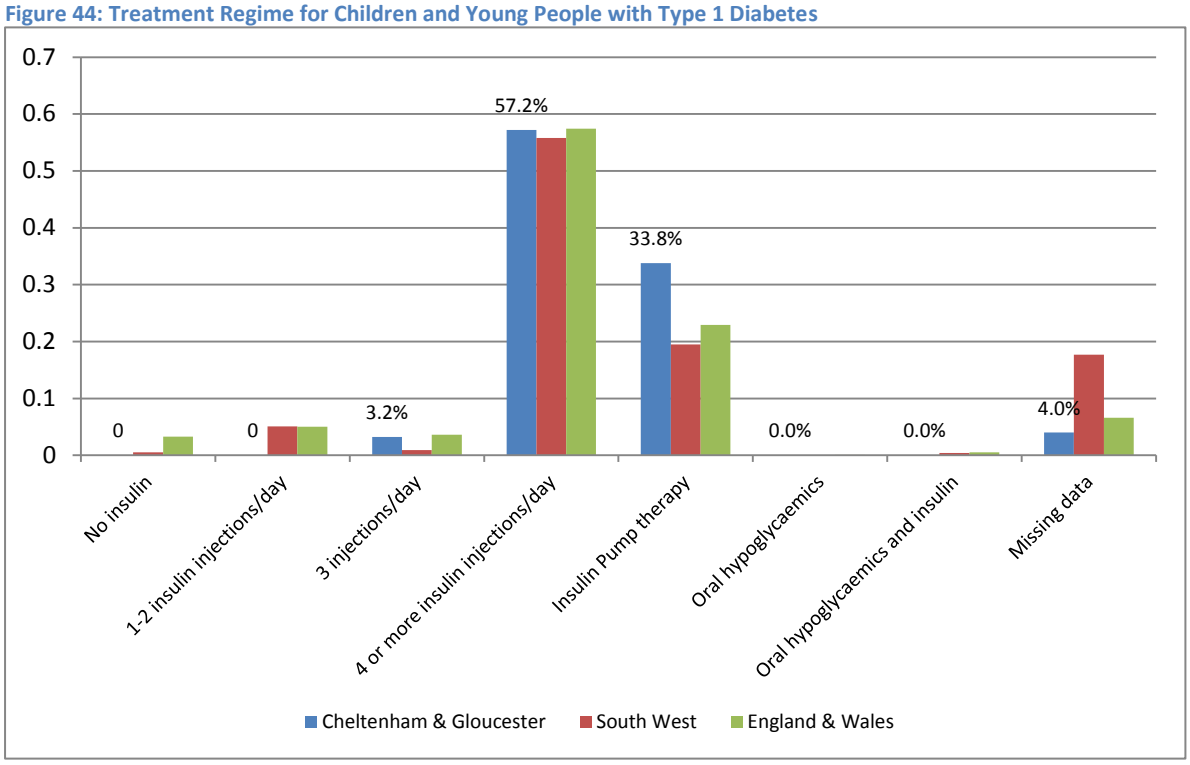


Source: National Paediatric Diabetes Audit

NICE Quality Standard advices that children and young people with Type 1 Diabetes should be offered intensive insulin therapy to help them maintain near normal blood glucose levels. Diabetes management should include education, support and access to psychological services.

The 2014/15 National Paediatric Audit showed that a higher proportion Gloucestershire' s CYP with Type 1 Diabetes (about a third)is managed with Insulin Pump therapy compared with regional and national averages of 19.5% and 22.9% respectively (Figure 44). This suggests that Gloucestershire is working hard at meeting the requirements of offering these CYP intensive insulin therapy as recommended by NICE.

Figure 44: Treatment Regime for Children and Young People with Type 1 Diabetes



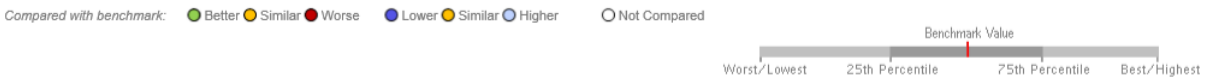
Source: National Paediatric Diabetes Audit 2014/15

In England in 2014/15, 58.9% of CYP with Type 1 Diabetes were recorded as having received structured patient education. This was 39.5% in the South West. In Gloucestershire, 58% of CYP with Diabetes received structured education compared with a regional average of 38.8% and a national average of 57.4%.

5.1.4. Complications of Diabetes – Adults

The main complications driving the cost of Diabetes in the NHS nationally are heart disease (Myocardial Infarction, Coronary Heart Disease, Heart failure and other CVD), kidney failure and other renal costs, Neuropathy, Stroke and foot ulcers/amputations. Table 15 shows that in terms of additional risk among people with Diabetes, Gloucestershire performs worse for angina and minor amputations, compared with the England average, but performs better for renal replacement therapy.

Table 15: Complications from Diabetes in Gloucestershire, 2010/11 – 2012/13



Indicator	Period	Gloucestershire		ONS 2001 cluster group	England	England		
		Count	Value	Value	Value	Worst/ Lowest	Range	Best/ Highest
Additional risk of myocardial infarction among people with diabetes	2010/11 - 12/13	608	119.2%	-	108.6%	277.1%		20.4%
Additional risk of heart failure among people with diabetes	2010/11 - 12/13	1,302	143.4%	-	150.0%	237.8%		73.5%
Additional risk of angina among people with diabetes	2010/11 - 12/13	1,804	158.4%	-	136.8%	233.5%		69.8%
Additional risk of stroke among people with diabetes	2010/11 - 12/13	578	85.9%	-	81.3%	187.9%		21.4%
Additional risk of renal replacement therapy among people with diabetes	2010/11 - 12/13	170	224.7%	-	293.0%	655.1%		110.4%
Additional risk of minor amputation among people with diabetes	2010/11 - 12/13	172	1,369.0%	-	753.5%	2,209.1%		242.4%
Additional risk of major amputation among people with diabetes	2010/11 - 12/13	69	499.8%	-	445.8%	1,675.8%		42.3%

Source: PHE.
http://fingertips.phe.org.uk/diabetes#page/1/gid/1938132699/pat/110/par/ONS_5.07/ati/19/are/E38000062/iid/91036/age/1/sex/4

People of south Asian and African-Caribbean origin have an increased risk of developing complications of diabetes, such as heart disease, at a younger age than the rest of the population.

5.1.4.1. Cardiovascular Disease (CVD)

CVD (including Myocardial infarction) is a major cause of death and disability in people with Diabetes, accounting for 44% of fatalities in people with Type 1 Diabetes and 52% in people with Type 2 and other Diabetes63. In Gloucestershire, the additional risk[64] of myocardial infarction among people with diabetes was 119% compared to an England average of 108.6% between 2010/11 and 2012/13 (not statistically different). It is estimated that avoidable cardiac failure increased by 130% and angina by 67% between 2007 and 2012[65]. The additional risk of angina in people with Diabetes was 158.4% which was significantly worse than the England average of 136.8%. Poor blood pressure control further increases the risk of developing CVD.

5.1.4.2. Stroke

Poor blood pressure control increases the risk of suffering a Stroke. It is estimated that avoidable Stroke increased by 106% between 2007 and 2012 nationally. The additional risk for Gloucestershire patients was 85.9% compared with an England average of 81.3% (not statistically different)

5.1.4.3. Nephropathy

The risk of kidney disease is increased by poor blood pressure control. It is estimated that avoidable Renal Replacement Therapy increased by 95% between 2007 and 2012 nationally. The additional risk of renal replacement therapy in people with Diabetes in Gloucestershire was better than the

63 Morrish NJ, Wang SL, Stevens LK, et al (2001). Mortality and causes of death in the WHO multinational study of vascular disease in diabetes. *Diabetologia* 44 (2); 14–21. Cited in State of the nation 2016. Time to take control of Diabetes. Diabetes UK 2016

64 This indicator identifies the additional risk of someone with diabetes having a myocardial infarction over a three year period compared to the population without diabetes.

65 Diabetes UK. State of the Nation. Challenges for 2015 and beyond

England average (224.7% vs. 293%). The 2015 National Inpatient Audit found that 4.6% of patients in GRH and none in CGH had RRT compared with 3.7% nationally.

5.1.4.4. Foot Disease/Amputation

Among the various complications of diabetes, the diabetic foot is gaining a new importance because it implies for diabetics the highest number of hospital admissions and as well as considerable costs. NICE estimates that 10% of people with diabetes will have a diabetic foot ulcer[66] at some point in their lives[67] (i.e. about 3,761 people in Gloucestershire). A community survey in north-west England found the incidence of new ulceration to be 2.2% in the UK[68] (i.e. about 829 new cases a year in Gloucestershire). Foot ulcers are more common in male patients[69] and in people from European descent than in Asian and African-Caribbean populations[70].

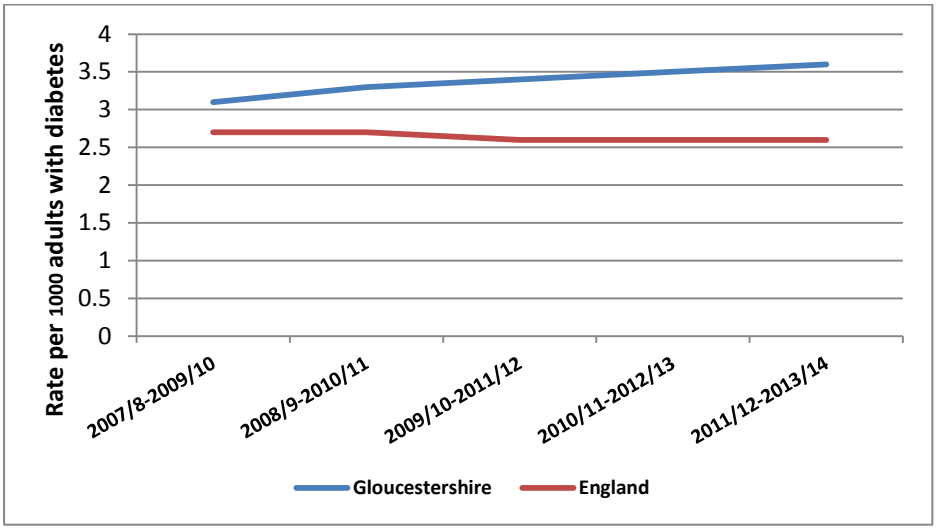
It is estimated that the greatest proportion of patients (47%) **admitted specifically for the management of diabetes** are admitted with active foot disease[71]. The 2015 Inpatient Audit found that almost half of this cohort was admitted for active foot disease nationally. 19.1% of **patients with Diabetes** in CGH were admitted with active foot disease compared with 8.9 nationally putting CGH in the highest quartile nationally, the proportion having increased in recent years. Only 10.6% of diabetics however received a foot risk assessment within 24 hours of their admission, and 10.6% at some point during their hospital stay. This compares with a England average of 28.7% and 34% respectively, putting CGH in the lowest quartile. In GRH, only 1.6% of patients with Diabetes were admitted with active foot disease (the proportion having decreased over the years) putting this at the lowest quartile nationally. The differences in both sites needs further exploration within the ongoing work on diabetic footcare to ensure equity of provision of high quality supporting community and primary care services.

NICE suggests that the risk of foot problems is increased largely because of either diabetic neuropathy[72] or peripheral arterial disease[73]. In the UK, the incidence of new ulceration rises to 7.2% in people with neuropathy[74] (as against 2.2% generally) highlighting the fundamental importance of this complication.

[66] Defined as a localised injury to the skin and/or underlying tissue, below the ankle, in a person with diabetes.
[67] National Institute for Health and Care Excellence (2015). Diabetic foot problems: prevention and management. https://www.nice.org.uk/guidance/ng19
[68] Abbott CA, Carrington AL, Ashe H, et al. The NorthWest Diabetes Foot Care Study: incidence of, and risk factors for, new diabetic foot ulceration in a community-based cohort. Diabet Med 2002; 19: 377–84
[69] Ibid
[70] Abbott CA, Garrow AP, Carrington AL, et al. Foot ulcer risk is lower in South-Asian and African-Caribbean compared with European diabetic patients in the UK. Diabetes Care 2005; 28:1869–1875.
[71] McInnes, A. D. Diabetic foot disease in the United Kingdom: about time to put feet first. Journal of Foot and Ankle Research 2012, 5:26
[72] Nerve damage or degeneration
[73] Poor blood supply due to diseased large and medium-sized blood vessels in the legs
[74] Abbott CA, Vileikyte L, Williamson S, et al. Multicenter study of the incidence of and predictive risk factors for diabetic neuropathic foot ulceration. Diab Care 1998; 21: 1071–75.

Amputations may be the first sign of diabetes with a UK study showing that 15% of patients undergoing amputations were first diagnosed with diabetes on that hospital admission[75]. Trend data shows that amputations rates in people with diabetes has been consistently higher than England averages and has been increasing in Gloucestershire since 2007/8-2009/10 (Figure 45).

Figure 45: Annual Amputations per 1000 Adults with Diabetes



Source: National Cardiovascular Intelligence Network. Diabetes Foot Care Activity Profiles. http://www.yhpho.org.uk/diabetesprofilesfoot/default.aspx

5.1.4.5. Neuropathy

Diabetic peripheral neuropathy (DPN) is an impairment of normal activities of the nerves throughout the body and can alter autonomic[76], motor, and sensory functions[77]. This frequent complication of diabetes can be the first manifestation of **undiagnosed** diabetes that prompts the patient to seek medical attention.

Neuropathy is common in diabetes, affecting 20%- 50% of people with the condition. The overall prevalence of neuropathy in patients attending hospital diabetic clinics in the UK has been estimated to be 28.5% (Type 1 was 22.7% and Type 2 was 32.1%). Prevalence was found to increase with age and with duration with it being present in more than 50% of Type 2 patients aged over 60 years. This underscores the importance of improved screening, especially in older patients.

Neuropathy may give rise to painful symptoms in a person's legs, which are typically worse at night. Chronic painful neuropathy is the most common type of neuropathy and is estimated to affect up to 26% of people with diabetes[78] (9,795 in Gloucestershire). Neuropathy may also be completely painless with the person's feet feeling numb and the pain and temperature sensations that normally

[75] Deerochanawong C, Home PD, Alberti KG. A survey of lower limb amputations in diabetic patients. Diabet Med 1992; 9:942–946.

[76] The autonomic nervous system regulates the functions of our internal organs e.g. heart, intestine, stomach

[77] LeQuesne P, Parkshouse N, Faris I. Neuropathy. In: Faris I, editor. The management of the diabetic foot. 2nd ed. Edinburgh: Churchill Livingstone; 1991. p. 41

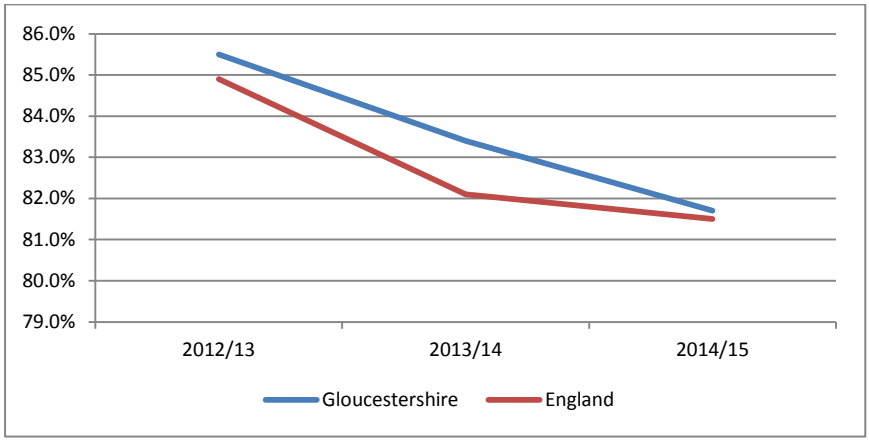
[78] Ziegler, D. (2010) Diabetic Peripheral Neuropathy in Holt RIG, Cockram CS, Flyvbjerg A et al (ed.) Textbook of diabetes, 4th edition. Oxford: Wiley-Blackwell

protect the feet from injury being reduced or lost. Patients may therefore be unaware of injuries sustained which then go unnoticed. It is instructive to note that the South West SCN Peer Review Team found that many of the Gloucestershire patients they interviewed had not understood the significance of neuropathy and associated risks as they expected pain to be an indicator of a problem. It is worth ensuring that this is emphasised as part of the general and structured education provided to patients and carers in the county.

Neuropathy also leads to dry skin and results in the build up of thick, hard skin (callus) under weight-bearing areas of the feet. Furthermore, walking patterns are often altered and unsteadiness is common. As a result of these factors, some areas on the soles of the feet are forced to resist high pressure when a person walks with resultant ulcers developing under these high-pressure areas. It has been suggested that the commonest combination of factors resulting in foot ulceration was peripheral neuropathy, foot deformity and trauma[79].

Figure 46 shows a downward trend in foot examination and risk classification in patients with Diabetes both at a national and a local level. The rate of fall nationally seems to be slowing which is not yet apparent in Gloucestershire. This is disheartening given that up to 50% may have neuropathy which greatly increases the risk of foot ulcers. This therefore needs a big push in the county.

Figure 46: Patients with Diabetes who had a foot examination and risk classification [80]



Source: National General Practice Profiles

[79] Reiber GE, Vileikyte L, Boyko EJ, et al. Causal pathways for incident lower-extremity ulcers in patients with diabetes from two settings. Diabetes Care 1999; 22: 157–162 Cited in Bolton, A. (2015). The diabetic foot: epidemiology, risk factors and the status of care. Diabetes Voice Vol 50. Special Issue. http://www.idf.org/sites/default/files/attachments/article_368_en.pdf)

[80] Patients with diabetes are at high risk of foot complications. Evaluation of skin, soft tissue, musculoskeletal, vascular and neurological condition on an annual basis is important for the detection of feet at raised risk of ulceration. The foot inspection and assessment should include:

- identifying the presence of sensory neuropathy (loss of the ability to feel a monofilament, vibration or sharp touch) and/or the abnormal build up of callus
- identifying when the arterial supply to the foot is reduced (absent foot pulses, signs of tissue ischaemia or symptoms of intermittent claudication)
- identifying deformities or problems of the foot (including bony deformities, dry skin or fungal infection), which may put it at risk
- identifying other factors that may put the foot at risk (which may include reduced capacity for self-care, impaired renal function, poor glycaemic control, cardiovascular and cerebrovascular disease, or previous amputation).

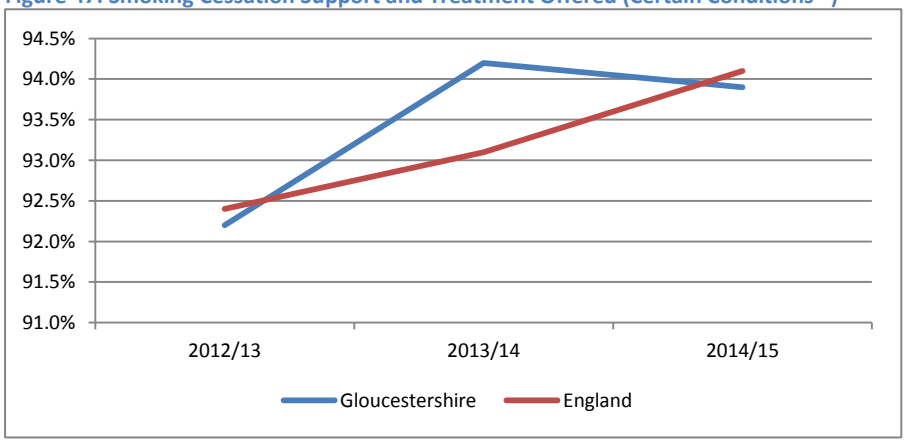
Prolonged exposure to higher than normal glucose levels is known to damage the nerves and cause neuropathy. High levels of triglycerides are also associated with the development of nerve damage. Maintaining an optimal level of glucose and triglycerides would help in reducing the incidence and prevalence of diabetic neuropathy. (See section 5.2 for local performance with diabetic control)

5.1.4.6. Peripheral Arterial Disease (PAD)

Damage to the blood vessels leading to the legs and feet (peripheral vascular disease) is also more common in people with diabetes compared to those without the condition, and may be present with neuropathy. It increases the risk of developing foot ulcers and contributes to poor healing.
PAD is increased by age, duration of diabetes, and presence of peripheral neuropathy. The true prevalence of PAD in people with diabetes is difficult to estimate accurately, as most patients are asymptomatic, many do not report their symptoms, screening modalities have not been uniformly agreed upon, and pain perception may be blunted by the presence of peripheral neuropathy[81]. NICE estimates that PAD affects 1 in 3 people with diabetes over the age of 50. Patients with PAD and diabetes may thus present later with more severe disease and have a greater risk of amputation.

Generally, diabetes and smoking have been identified as the strongest risk factors for PAD with cigarette smoking being the single most important modifiable risk factor for the development and exacerbation of PAD. In patients with PAD, tobacco use is associated with increased progression of atherosclerosis as well as increased risk of amputation[82]. Figure 47 shows the performance in Gloucestershire in terms of providing smoking cessation support and treatment for pertinent conditions (including PAD) has unfortunately stalled and is now lower than the England average. The 11 GP Practices with figures significantly below the national average will benefit from additional support from the Stop Smoking Service (Appendix 2).

Figure 47: Smoking Cessation Support and Treatment Offered (Certain Conditions[83])



Source: Public Health England. National General Practice Profiles

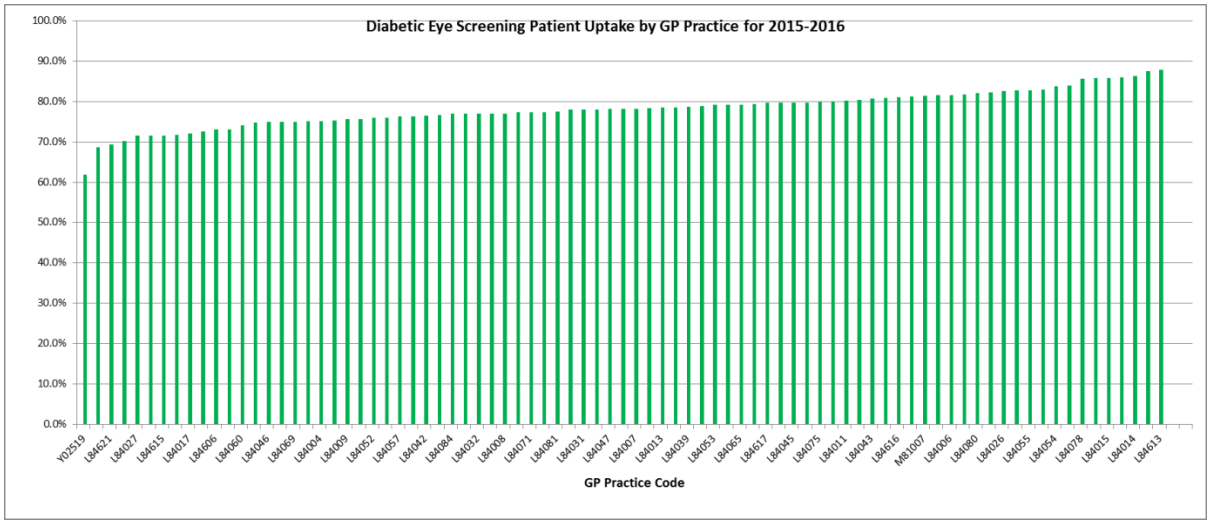
[81] American Diabetes Association. Consensus Statement. Peripheral arterial disease in people with diabetes. DIABETES CARE, VOLUME 26, NUMBER 12, DECEMBER 2003
[82] Lassila R, Lepantalo M: Cigarette smoking and the outcome after lower limb arterial surgery. Acta Chir Scand 154:635–640, 1988. Cited in American Diabetes Association Consensus Statement
[83] These conditions include any or any combination of the following conditions: coronary heart disease, PAD, stroke or TIA, hypertension, diabetes, COPD, CKD, asthma, schizophrenia, bipolar affective disorder or other psychoses who smoke whose notes contain a record of an offer of support and treatment within the preceding 12 months;

5.1.4.7. Diabetic Retinopathy

People with diabetes are at higher risk of developing retinopathy which, if left undetected and untreated, can lead to blindness. Diabetes is the leading cause of preventable sight loss in people of working age in the UK.

Uptake of diabetic eye screening varies by GP practice from 61.8% in Gloucester Health Access Centre (GHAC) to 87.8% in Stonehouse Health Clinic.

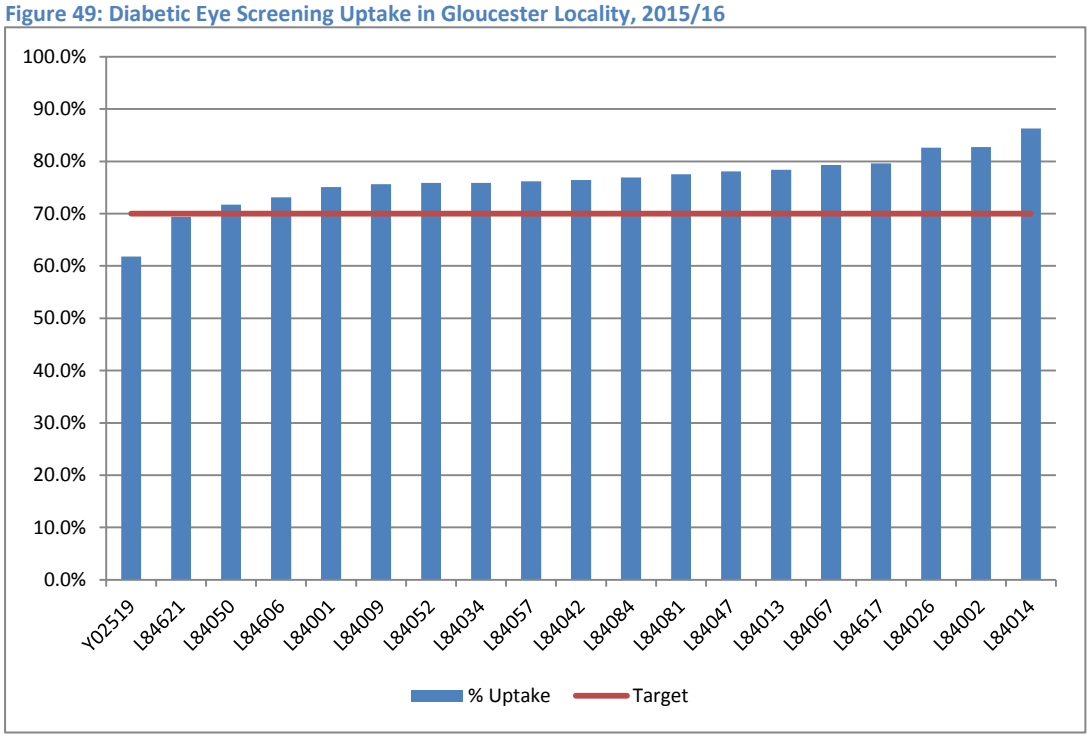
Figure 48: Diabetic Eye Screening Uptake in Gloucestershire by GP Practice, 2015/16



Source: Bath, Gloucestershire, Swindon and Wiltshire Screening and Immunisation Team

All GP localities have an average uptake that is at least equal to the national target of 70% except for Gloucester Locality (Figure 49) which can benefit f5rom some targeted action from the Eye Screening Service.

Figure 49: Diabetic Eye Screening Uptake in Gloucester Locality, 2015/16



Source: Bath, Gloucestershire, Swindon and Wiltshire Screening and Immunisation Team

It is however instructive to note that despite this relatively good performance, Gloucestershire needs to perform much better at screening CYP (see section 5.1.3.4.). The Diabetic Eye Screening Service should be challenged to improve on this through more innovative means of engaging CYP and their families in the screening process.

The trend in the rate of **preventable sight loss from Diabetic eye** disease in Gloucestershire had remained similar to than of the England average (2010/11 to 2013/14) but has more recently become significantly better in 2014/15. Table 16 shows the numbers over the years.

Table 16: Preventable Sight Loss from Diabetic Eye Disease in Gloucestershire, 2010/11 to 2014/15

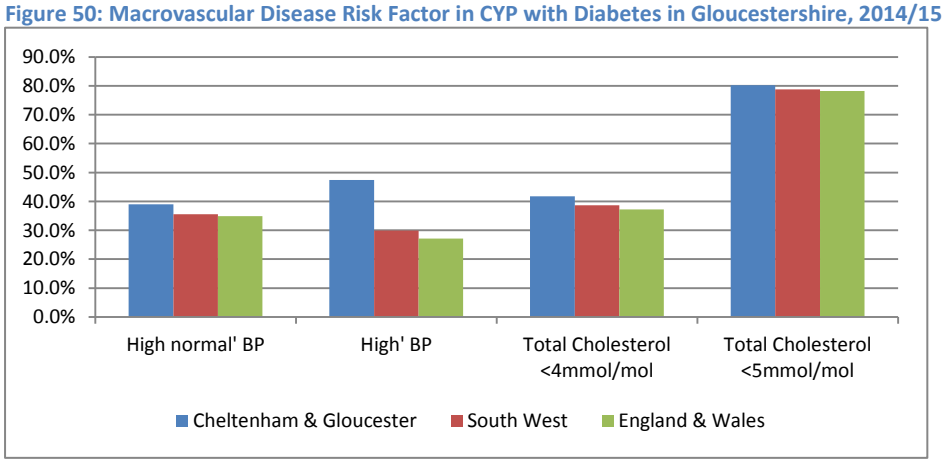
Year	County Count	County Rate/100,000	England Rate/100,000
2010/11	19	3.7	3.6
2011/12	13	2.5	3.8
2012/13	22	4.2	3.5
2013/14	10	1.9	3.4
2014/15	6	1.1	3.2

5.1.5. Complications of Diabetes - Children

The risk of small blood vessel (microvascular) disease like chronic kidney diseases and eye disease is increased in people with Diabetes. Albumin in the urine depicts an increased risk of kidney disease. This risk was found to increase with age and with deprivation for all young people with diabetes. The 2014/15 Paediatric Audit found the presence of micro or macroalbuminuria to be higher in the South West (13.6%) compared with the England average (11.6%). Abnormal eye screening increases with age in young people with 14.5% of young people in the South West found to have abnormal findings compared with the England average of 13%. The figures for these abnormalities for CGH and GRH were supressed due to small numbers.

Large blood vessel (macrovascular) disease is common among people with diabetes with relevant risk factors being high blood pressure, abnormal blood lipids, high body mass index and smoking. The adverse effects of smoking are strongest with Type 1 Diabetes patients. Figure 50 shows there is scope for improvement in the management of blood pressure in CYP with Diabetes in Gloucestershire.

Figure 50: Macrovascular Disease Risk Factor in CYP with Diabetes in Gloucestershire, 2014/15



Source: National Paediatric Diabetes Audit 2014/15

The overweight and obesity associated with Type 2 Diabetes also bring an increased risk of renal complications in particular, and of problems such as hypertension and dyslipidaemia.

5.2. Diabetic Control

5.2.1. Adults

The Public Accounts Committee in its recent review of progress with the care and management of adults stated that performance in delivering the nine care processes and achieving the three treatment standards[84], which help to minimise the risk of diabetes patients developing complications in the future, has stalled. The National Diabetes Audit 2014/15 found that people with Type 1 Diabetes are less likely than those with Type 2 to receive all the eight care processes. People aged under 40 (with either Type 1 or Type 2) are also less likely to receive all their annual care processes. It also found that blood tests (HJbA1c, serum creatinine, cholesterol) and blood pressure are more reliably performed than other care processes.

Table 17 shows that Gloucestershire performs much better than its peers in terms of control of blood sugar. Its performance is similar to peers for blood pressure and cholesterol control. It is instructive to note that cholesterol control has recently improved from being worse than peers to similar to peers. Gloucestershire's value seems lower than England average unlike sugar and blood pressure control.

Table 17: Diabetic Treatment Targets

Indicator	Period	Gloucestershire		ONS 2001 cluster group	England	Prospering Smaller Towns		
		Count	Value	Value	Value	Worst/ Lowest	Range	Best/ Highest
Good blood sugar control in people with diabetes	2014/15	20,045	63.7%	61.0%	60.4%	54.4%		67.4%
Good blood pressure control in people with diabetes	2014/15	22,483	71.4%	70.7%	71.2%	64.4%		77.7%
Good cholesterol control in people with diabetes	2014/15	22,222	70.6%	70.7%	70.8%	65.7%		77.5%

Source: Public Health England. Diabetes.
http://fingertips.phe.org.uk/diabetes#page/1/gid/1938132700/pat/110/par/ONS_5.07/ati/19/are/E38000062/iid/91036/age/1/sex/4

Appendix 3 shows the variation with blood sugar control, Appendix 4 blood pressure control and Appendix 5 with cholesterol control among GP Practices in Gloucestershire

5.2.1.1. HbA1c

Meeting HbA1c targets reduces the risk of all diabetic complications. This makes the performance around this of particular importance. People with Type 1 Diabetes are much less likely to receive the HbA1c check – only 84% – compared with 95% of people with Type 2 and other Diabetes[85].

[84] NICE recommends treatment targets for HbA1c, blood pressure and serum cholesterol

[85] Health and Social Care Information Centre (2016). National Diabetes Audit – 2014–2015: Report 1, Care Processes and Treatment Targets

Nationally, it is estimated that a substantial proportion of people, especially those with Type 1 Diabetes, still have exceptionally high glucose levels – 15% of Type 1 and 6% of Type 2 patients have HbA1c equal to or above 86mmol/mol3

People with Type 1 Diabetes are much less likely to reach recommended targets than people with Type 2 diabetes. In 2014–2015, only 31% of people with Type 1 Diabetes met this target compared to 67% of those with Type 2 Diabetes. Blood glucose control remains high risk in most people with Type 1 Diabetes and in all younger people with Diabetes.

Gloucestershire was able to achieve HbA1c level of <=59mmol/mol in 63.7% of patients with Diabetes in 2014/15 with this ranging from 49.4% to 76%. 21 GP practise performed significantly better than England average with just 2 practices performing worse.

5.2.1.2. Blood Pressure

Meeting blood pressure targets reduces the risk of vascular complications and also reduces the progression of eye disease and kidney failure. In 2014–2015, 89% per cent of people with Type 1 Diabetes and 96% of those with Type 2 and other diabetes had their blood pressure checked – a similar figure to previous years. However, only 76% of all people with Type 1 Diabetes and 74% of people with Type 2 and other diabetes met the recommended treatment target. Despite this performance, the achievement of the target of <=140/80 has been steadily improving over time nationally.

Gloucestershire was able to achieve BP level of <=140/80 in 71.4% of people with Diabetes in 2014/15 with this ranging from 467.1% to 87.7% across GP Practices. 19 Practices performed significantly better than the England average with 14 significantly worse.

5.2.1.3. Cholesterol

Poor cholesterol control increases the risk of developing cardiovascular disease. In 2014–2015, 93 per cent of people with Type 2 and other diabetes received a cholesterol check, but only 79% of people with Type 1 had this essential check. Younger people were less likely to have their cholesterol checked than those aged over 40. This check was carried out in only 66% per cent of people with Type 1 in the under 40 age group and 83% of those with Type 2 in that age group. 29% of people with Type 1 and 22% of people with Type 2 and other Diabetes did not meet the cholesterol treatment target of <5mmol/L, and 70 per cent with Type 1 and 58% with Type 2 and other diabetes failed to meet the tougher target of <4mmol/L

Gloucestershire was able to achieve Cholesterol levels of <=5mmol/l in 70.6% of people with Diabetes in 2014/15, with this ranging from 55.6% to 88.5% across Practices. Eight Practices performed significantly better than the England average with 6 performing worse.

Adults with Type 1 Diabetes are less than half as likely to achieve all three treatment targets than adults with Type 2. The first audit from the National Diabetes Audit on insulin pump therapy, published in 2016 found that people with Type 1 diabetes on an insulin pump are more likely to achieve all three NICE treatment targets of HbA1c, blood pressure and cholesterol.

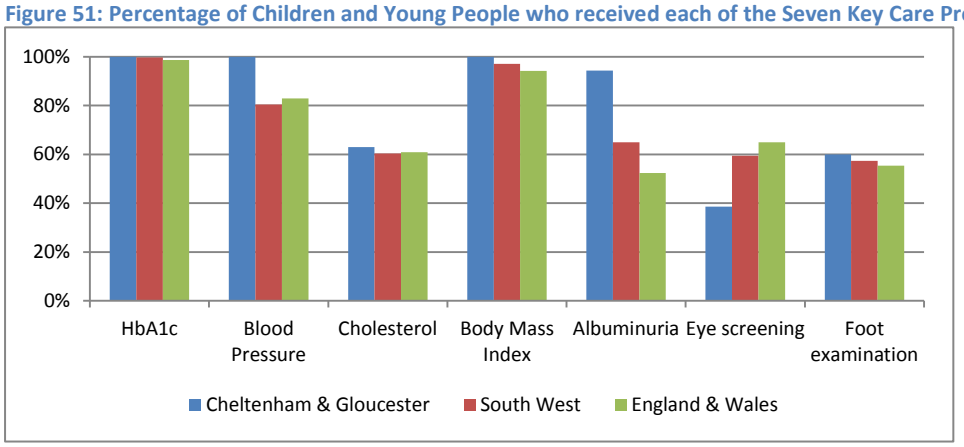
5.2.2. Children and Young People

NICE recommends seven key care processes for CYP with diabetes. Apart from measuring **HbA1c in CYP of all ages**, the additional six processes which are expected to be carried out in CYP from the age of 12 years include:

1. Body Mass Index – measure of cardiovascular risk
2. Blood pressure – measure of cardiovascular risk
3. Urinary albumin – urine test for kidney function
4. Cholesterol – blood test for cardiovascular risk
5. Eye screening – photographic test for eye risk
6. Foot examination – for ulcer risk

Figure 51 shows the proportion of CYP in Gloucestershire who received each of the care processes compared with regional and national averages. The Gloucestershire Eye Diabetic Eye Screening service would need to continue with its efforts at increasing the uptake of screening in CYP, as this is an area where local performance falls well below regional and national averages.

Figure 51: Percentage of Children and Young People who received each of the Seven Key Care Process, 2014/15



Source: National Paediatric Diabetes Audit 2014/15

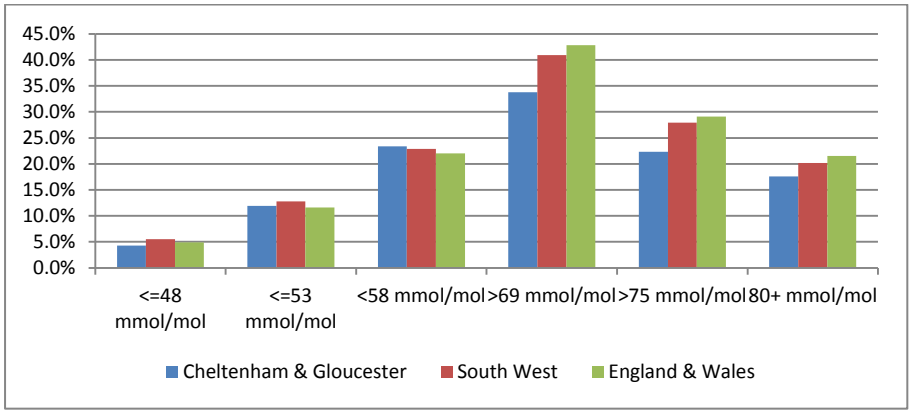
The National Paediatric Diabetes Audit 2014/15 found that nationally, an average 25.4% of young people aged 12 years and over completed **all seven key care processes**, a gradual increase in trend from 2010/11. In Gloucestershire Hospitals, though this was below national average at 22.1%, it was however not found to be statistically different. Nonetheless, there is huge scope to improve on this performance, and to learn from other PDUs in the SW who performed much better.

5.2.2.1. Type 1

Children and young people with suspected Type 1 Diabetes should be referred the same day to a multidisciplinary paediatric diabetes team to confirm diagnosis and to provide immediate care. NICE recommends that the management of Type 1 Diabetes, should seek to achieve stricter targets for blood glucose control with the aim of trying to reach a glycated haemoglobin (HbA1c) level near the normal range and near normoglycaemia, in order to further reduce the long-term risks associated with the condition. This tight control may be achieved by intensive insulin management (multiple daily injections or insulin pump therapy) from diagnosis, accompanied by carbohydrate counting. Gloucestershire seems to perform comparatively better in terms of intensive insulin therapy in this

regard (see section 5.1.3.4.) Figure 52 shows that though comparatively fewer proportions of CYP with Type 1 Diabetes in Gloucestershire have undesirable higher HbA1c levels, we could perhaps improve on maintenance of a near normal blood glucose level to reduce the risk of long-term complications and improve quality of life.

Figure 52: Percentage of CYP with Type 1 Diabetes in Gloucestershire meeting HbA1c Targets, 2014/15



Source: National Paediatric Diabetes Audit 2014/15

The 2014/15 National Paediatric Audit found that better control was achieved in the first year following diagnosis compared to the longer term. It also found that CYP living in the most deprived areas had worse outcomes in terms of HbA1c. Furthermore, insulin pump usage was found to be greater in younger age groups and in the least deprived areas. It is recommended that we review outcomes in CYP to see if we need to further target these specific cohorts of CYP.

5.2.2.2. Type 2

Type 2 diabetes should be considered in children and young people with suspected diabetes who:

- have a strong family history of type 2 diabetes
- are obese at presentation
- are of black or Asian family origin
- have no insulin requirement, or have an insulin requirement of less than 0.5 units/kg body weight/day after the partial remission phase
- show evidence of insulin resistance

Much of the general care for Type 2 Diabetes is the same as for Type 1 Diabetes, although the initial management is different.

In England in 2014/15, 40.8%% of CYP with Type 2 Diabetes were recorded as having Structured patient education[86], with this being just 12.5% in the South West

[86] NPDA defines this as 'a programme of self-management education, tailored too the needs of the child or young person and their family, both at the time of initial diagnosis and on an ongoing basis throughout the child or young person's attendance at the paediatric diabetic service. This is a programme offered in addition to the education provided at routine outpatient consultations'

Summary

- *Diabetes care should include all the eight NICE recommended annual care processes with patients (and carers) also attending a structured education programme when diagnosed. The ninth one is delivered by the NHS Diabetes Eye Screening Service.*
- *Service delivery for Diabetes in Gloucestershire care cover primary care (including general Diabetic care and a community enhanced service), Community Diabetes Specialist Service supporting the management of Type 2 Diabetes (including provision of structured education), secondary care (including outpatient and inpatient services for adults and children)*
- *The Community Enhanced Service (CES) is available at two levels to all GP practices in the county with the aim of improving knowledge and skills, reducing variation in quality of care, minimise referrals and repatriate stable non-complex patients from secondary care. It is hoped that this CES would also lead to reduction in outpatient referrals and follow-up. It is not clear how well this service is meeting these aims and this would need to be further explored with the Information team, especially given the decrease in performance in terms of completion of the eight care processes at a county level as well as the huge unwarranted variation across practices in this respect. It would also be good to explore the current performance of the seven Practices not signed up to the CES in particular against those signed up, to ensure the most effective use of the funds*
- *The Community Diabetes Team provides specialist support to primary care in the management of people with Type 2 Diabetes. The team also provide structured education programmes which have recently been restructured and now enjoy good engagement with patients. This performance however needs to be explored in terms of measurable improvement in the county's performance (including attendances)n given that referrals to such sessions in Gloucestershire have decreased in recent years, though still higher than national average around structured education. The CDT has also been recently re-designated to provide a fully primary-care facing and supporting services with specific objectives. It is recommended that the CPG continues to monitor and evaluate how well these objectives are being met.*
- *GHNHSFT provides secondary care for adults and CYP with Diabetes. Outpatient services include a general diabetic clinic, joint Diabetes/Renal clinic, antenatal clinic and Insulin Pump clinic. There is also a Young Adult Clinic which could benefit from exploration as to how well transition CQUIN if working for young people transiting to adult services especially around motivation to manage their condition which is core to a successful transition. Specialist diabetes nursing provision is below England average on both hospital sites, especially in CGH. This is of concern given that there is evidence that specialist diabetic inpatient teams can reduce prescribing errors, improve patient outcomes, recue length of stay and reduce the number of admissions. Savings from introducing such teams are likely to substantially outweigh associated costs. There is no provision of Podiatrist Care (currently being addressed) or specialist pharmacist care in either of the hospital. Specialist pharmacist support can help with prescribing errors which seem to be an issue locally.*
- *The greatest proportion of people treated in hospital (4 in 10)had Type 2 Diabetes, and the proportion of inpatients with Type 2 (diet only) was higher in both hospitals than the England average, which might point to issues around consistent and appropriate dietary support in the community. Also, the proportion of inpatients with Type 2 (non-insulin) has moved from*

below national average to similar (unlike Type 2 insulin)suggest there is scope to explore how well the CDT are able to support Type 2 patients in the community including what additional support they may need.

- *The proportion of patients with Diabetes admitted specifically for the management of Diabetes has remained relatively stable nationally, decreased in GRH but increased in CGH. This pattern is worth exploring in terms of what the underlying determinants are. For patients admitted for the management of diabetes in CGH, 19.1% were admitted for active foot disease with this being just 1.6% in GRH in 2015 compared with 8.9% nationally. Despite this relatively high figure, only 10% received a foot check during their stay (34% nationally). The ongoing work on diabetic footcare should explore this further as well.*
- *The proportion of inpatients with Diabetes admitted to GRH in 2015 as an emergency was above national average and in the highest quartile nationally, with GRH generally having a higher than average proportion of admissions as emergencies over the years. An understanding of what constitutes these emergencies from the catchment areas would be necessary in order to reduce rates by providing appropriate support outside hospital., S&BV locality which has a lower prevalence of Diabetes has higher numbers of emergency admissions compared to Forest which has a higher than average prevalence. Ketoacidosis in patients with insulin-dependent Diabetes the reason for emergency admission in a third of cases followed by patients with non insulin dependent Diabetes without any complications (22% of admissions)and insulin dependent Diabetes without complications representing 19%*
- *There has been an increase in recent years in excess bed days which has been found to be the second highest source of cost for diabetic care. This seems to be particular issue for Gloucester and Forest localities*
- *Patients in GRH seems to generally have a higher than national average rate of hypoglycaemic episodes while on admission. Though the trend is in a downward direction, more concerted efforts are needed to bring this below national average, especially as hypoglycaemic episodes are avoidable and should be a rare occurrence in a hospital setting. The use of insulin infusion was found to be inappropriate in about 43% of patients in GRH in 2015 which might have been responsible for the higher than average rate of severe hypoglycaemia. This needs to be further explored given the magnitude as well as its occurrence following a number of years of appropriate use in previous years. Medication errors, prescription errors and insulin errors were all found to be higher in both hospitals (in the highest quartile) than the England average. Performances in these areas have been largely in the highest quartile over the years and would therefore benefit from further exploration.*
- *The county does well with all care processes for CYP except for eye screening which was below regional and national averages. The Diabetic Eye screening service needs to find more innovative ways of improving uptake in CYP and the CPG should keep a close eye on performance in this area.* 58% of CYP with Diabetes received structured education compared with a regional average of 38.8% and a national average of 57.4%. In line with NICE Quality Standard which recommend intensive insulin therapy, about a third of Gloucestershire' s CYP with Type 1 Diabetes is managed with Insulin Pump therapy compared with regional and national averages of 19.5% and 22.9% respectively
- *The main complications driving the cost of Diabetes in the NHS nationally are heart disease (Myocardial Infarction, Coronary Heart Disease, Heart failure and other CVD), kidney failure*

and other renal costs, Neuropathy, Stroke and foot ulcers/amputations. People of south Asian and African-Caribbean origin have an increased risk of developing complications of diabetes, such as heart disease, at a younger age than the rest of the population. These groups of people will benefit from targeted interventions around optimally managing their Diabetes. The additional risk of angina in people with Diabetes was `158.4% which was significantly worse than the England average of 136.8%, just like the additional risk of minor amputations while that of renal replacement therapy was better. The diabetic foot implies for diabetics the highest number of hospital admissions and as well as considerable costs. 19.1% of patients with Diabetes in CGH were admitted with active foot disease compared with 8.9 nationally putting CGH in the highest quartile nationally, the proportion having increased in recent years. Only 10.6% of diabetics however received a foot risk assessment within 24 hours of their admission, and 10.6% at some point during their hospital stay. This compares with a England average of 28.7% and 34% respectively, putting CGH in the lowest quartile. In GRH, only 1.6% of patients with Diabetes were admitted with active foot disease (the proportion having decreased over the years) putting this at the lowest quartile nationally. The differences in both sites needs further exploration within the ongoing work on diabetic footcare to ensure equity of provision of high quality supporting community and primary care services. The risk of foot problems is increased largely because of either diabetic neuropathy or peripheral arterial disease. Chronic painful neuropathy is the most common type of neuropathy (with up to about 9,795 diabetics affected in Gloucestershire), but Neuropathy may also be completely painless. Many patients may not understand the significance of neuropathy and associated risks as they expected pain to be an indicator of a problem. It is therefore worth ensuring that this is emphasised as part of the general and structured education provided to patients and carers in the county. There has been a downward trend in foot examination and risk classification in patients with Diabetes both at a national and a local level. The rate of fall nationally seems to be slowing which is not yet apparent in Gloucestershire. There is therefore a need to reverse this. Also, maintaining an optimal level of glucose and triglycerides would help in reducing the incidence and prevalence of diabetic neuropathy. Peripheral arterial disease (PAD) is increased by age, duration of diabetes, and presence of peripheral neuropathy. Cigarette smoking is the single most important modifiable risk factor for the development and exacerbation of PAD. The level of provision of smoking cessation support and treatment for pertinent conditions (including PAD) in the county has unfortunately stalled and is now lower than the England average. Additional support would need to be provided to those Practices performing significantly below average. Diabetes is the leading cause of preventable sight loss in people of working age in the UK. All GP localities have an average retinopathy screening uptake that is at least equal to the national target of 70% except for Gloucester Locality which can benefit from some targeted action from the Eye Screening Service. Gloucestershire also needs to perform much better at screening CYP and the Diabetic Eye Screening Service should be challenged to improve on this through more innovative means of engaging CYP and their families in the screening process.

- *The risk of small blood vessel (microvascular) disease like chronic kidney diseases and eye disease in CY increases with age and with deprivation with the presence of micro or macroalbuminuria found to be higher in the South West (13.6%) compared with the England average (11.6%). Abnormal eye screening increases with age in young people with 14.5% of*

young people in the South West found to have abnormal findings compared with the England average of 13%. The risk factors for large blood vessel (macrovascular) disease include high blood pressure, abnormal blood lipids, high body mass index and smoking. The adverse effects of smoking are strongest in CYP with Type 1 Diabetes patients. Though doing relatively well, there is scope for improvement in the management of blood pressure in CYP with Diabetes in Gloucestershire.

- *For treatment targets, Gloucestershire performs much better than its peers in terms of control of blood sugar, while it is similar to peers for blood pressure and cholesterol control. These performances however vary greatly across GP Practices. Meeting HbA1c targets reduces the risk of all diabetic complications, which makes our performance around this of particular importance. People with Type 1 Diabetes are much less likely to receive the HbA1c check – only 84% – compared with 95% of people with Type 2 and other Diabetes. People with Type 1 Diabetes are much less likely to reach recommended targets than people with Type 2 Diabetes (31% versus 67% nationally) Blood glucose control remains high risk in most people with Type 1 Diabetes and in all younger people with Diabetes. Gloucestershire was able to achieve HbA1c level of <=59mmol/mol in 63.7% of patients with Diabetes in 2014/15 with this ranging from 49.4% to 76%. 21 GP practise performed significantly better than England average with just 2 practices performing worse. We would need to understand better how our performance compares across the two types of Diabetes. Gloucestershire seems to perform comparatively better in terms of intensive insulin therapy in CYP with Type 1 Diabetes. Though comparatively fewer proportions of CYP with Type 1 Diabetes in Gloucestershire have undesirably higher HbA1c levels, we could perhaps improve on maintenance of a near normal blood glucose level to reduce the risk of long-term complications and improve quality of life. The 2014/15 National Paediatric Audit found that better control was achieved in the first year following diagnosis compared to the longer term. It also found that CYP living in the most deprived areas had worse outcomes in terms of HbA1c. Furthermore, insulin pump usage was found to be greater in younger age groups and in the least deprived areas. It is recommended that we review outcomes in CYP to see if we need to further target these specific cohorts of CYP.*

6. Stakeholder Views

Views of stakeholders were explored from published literature (e.g. the National Paediatric Diabetes Audit, and the National Inpatient Audit), as well as through a 'service walktrough' at GRH. Though limited, these provide useful feedback for services and commissioners

6.1. Children and Young People

The Patient and Parent Reported Experience Measure (PREM) which was first carried out in 2013/14, gives details on feedback from CYP with Diabetes and their carers. The responses were very positive (strongly agree/agree) in Gloucestershire when compared to the regional and/or national averages, around the great majority of the questions (including those around getting advice, clinic appointments, age-appropriate surroundings, preparation for transition, peer support, availability of advice 24/7, contact with diabetes team) except for the following:

- My diabetes team know how to talk to me and understand my situation
- My diabetes team concentrate on finding solutions rather than on any previous difficulties
- I have the opportunity to provide feedback on my clinic experiences and improvements that could be made

These are areas for potential further exploration in terms of our Diabetes teams can better support CYP.

6.2. Inpatients

In the 2015 audit, the large majority of inpatients with diabetes said that they were satisfied or very satisfied with their diabetes care, with this proportion having increased from 2010. The audit however showed that less than half of inpatients were satisfied with their level of involvement in the planning of their diabetes treatment (45 per cent), with the proportion being satisfied having decreased over the years from 2010. With an essential aspect of the management of diabetes being the timely provision of suitable food, fewer patients in 2015 reported that the choice of meals was always or almost always appropriate, compared to 2013. The same was reported for the timing of meals. In terms of which area of their care patients felt the hospital needed to improve upon, better staff knowledge of Diabetes was the most popular area for improvement identified by them. Table 18 gives more details on this.

Table 18: Inpatients' Views of the Areas of Diabetes Care They Feel is Most Important for the Hospital to Improve by Diabetes Type, England and Wales, 2015

	Percentage of inpatients				
Area for improvement	Type 1	Type 2 (insulin)	Type 2 (non-insulin)	Type 2 (diet only)	Grand total
Better staff knowledge of diabetes	32.9	31.2	25.8	23.0	27.1
Suitability of meals	14.2	16.5	17.2	13.8	16.1
Timing of meals	10.3	7.8	6.4	5.3	6.8
Ability to self-test blood sugar	4.5	4.2	3.7	4.3	4.0
Ability to self-administer insulin	5.2	4.2	0.7	0.2	1.9
None of these areas need improvement	33.0	36.2	46.3	53.5	44.2

Source: National Diabetes Inpatient Audit 2015

6.3. Secondary Care Clinicians

Appropriateness of referrals from GPs was felt to be very much dependent on the individual GP, and could be occasionally too late. The clinicians felt that there were instances to suggest that Practices were unable to provide the 'right care' giving example around preconception care as a case in point. This may need to be explored further, especially in view of pre-conception counselling being part of the core services to be delivered through the Community Enhanced Service in primary care.
Clinicians also felt that the 'DNA' rate for attendances were very high (at 11% for new patients and 13% for follow-ups) when compared with approximately 4 -5% for other specialties.
Shortage of specialist diabetes nurses was highlighted as a local and national issue, with the team having lost a number of experienced diabetic nurses in the last 12 months.
Another issue highlighted was the relative lack of Type 1 support groups in the county.

An area of increasing worry is the appropriate management of younger patients with Type 2 Diabetes who are likely to need more aggressive management. Other issues highlighted were:

- The need for more GPwSI
- Healthy eating and cooking lessons for the population and for patients alike
- Access to psychology to enable patients prepare for the changes they need to make
- Training for staff in motivational interviewing

A separate detailed report is available which covers local engagement with patients and clinicians in Gloucestershire

Summary

- *Overall, feedback suggests local Diabetic services that are assessed as good or very good by stakeholders. A number of views are however worthy of further consideration:*
    - *Ability of Diabetes team to talk appropriately to CYP in order to optimally engage them*
    - *Focusing on solutions in terms of disease management for CYP instead of previous difficulties*
    - *Providing more opportunities for CYP to give feedback on clinic experiences and suggestions for improvement*
    - *Involvement of inpatients in the planning of their treatment*
    - *Choice and timing of meals for inpatients*
    - *Knowledge of Diabetes by staff*
    - *GP practices and preconception care*
    - *Availability of specialist Diabetes nurses*
    - *The need for GPwSI*
    - *Availability of support groups for Type 1 Diabetes*
    - *Healthy eating and cooking lessons*
    - *Access to psychology support*
    - *Staff training in motivational interviewing*

7. Evidence and Gaps in Service Provision

7.1. Evidence

A separate paper on evidence is available and should be consulted for best practice and evidence of effectiveness

7.2. Gaps in Service Provision

Gloucestershire has a comprehensive service provision for people with Diabetes across the county, going from community to primary, secondary and specialist care. There are also a number of support groups available. The relative lack of support for people with Type 1 Diabetes in the community has been highlighted.

An acknowledgement has been made of the gaps in the county around interventions for overweight/obese children and this is being addressed.

Additional support may however be needed for the prevention, management and self –care of Diabetes in people from deprived areas.

Adequacy of psychological support for specific high risk groups/cohort, and CYP would need to be explored, as well as optimal dietary support in the community and optimal access to Tier 3 obesity services in the county.

7.2.1. Priorities for Implementation

Priorities for implementation would include:

- Comprehensive and accessible obesity prevention and management services for CYP and adults
- Implementation of NHS DPP
- Demonstrable optimal management of Diabetes across primary, secondary and specialist
- Early and appropriate management of complications
- Enhancing the potential for self-care to support management of the conditions and complications

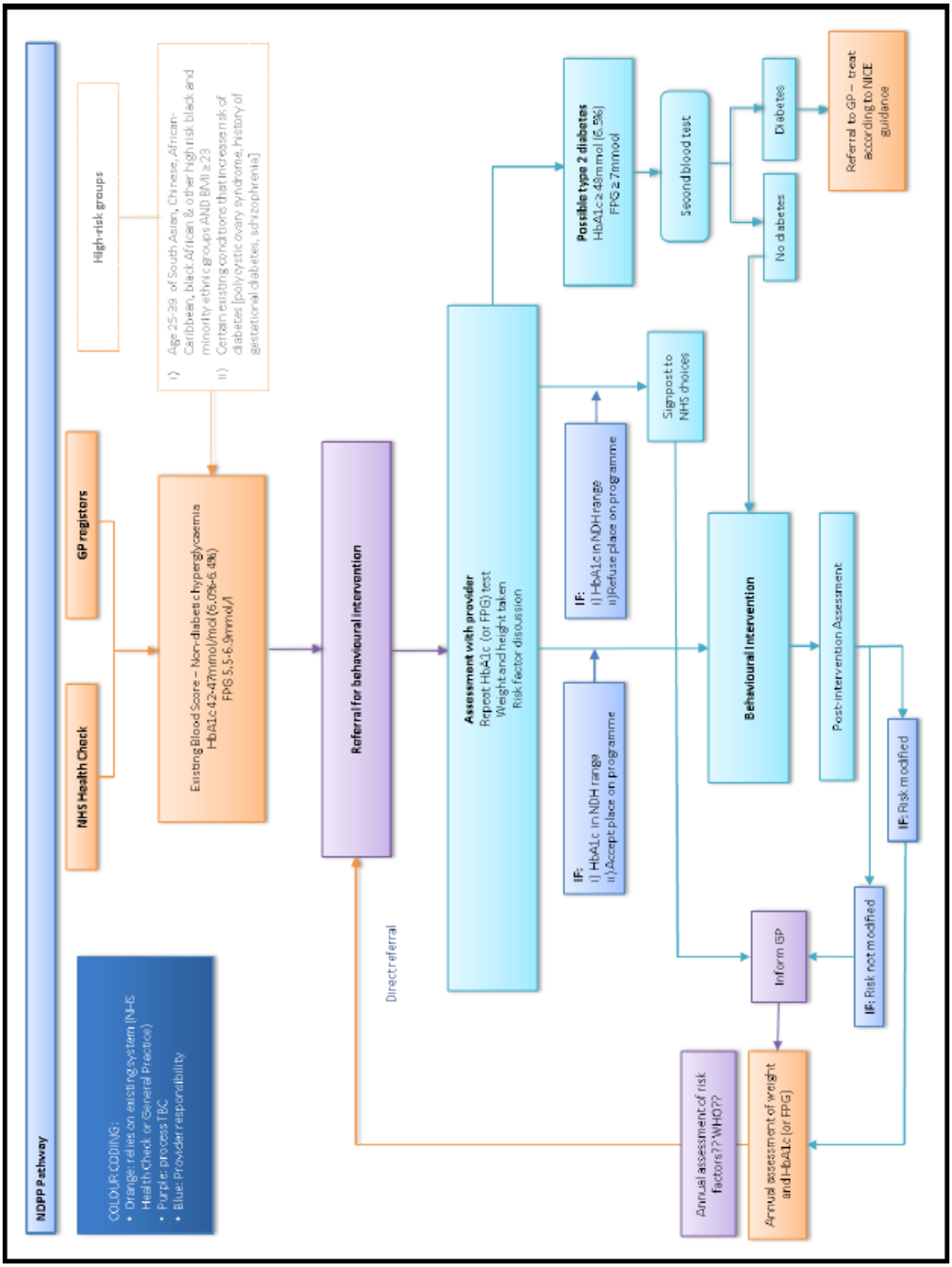
8. Recommendations

- Access, available support and outcomes in Gloucestershire patients with Type 2 Diabetes should be explored in specific groups (e.g. socially excluded groups, people with LD and mental Health problems), as well as for patients in Gloucester and Forest Localities
- There is a need to focus on prevention of Type 2 Diabetes in CYP targeting those from south Asian and Black communities especially in terms of appropriate ac cess to management of childhood obesity
- A review of the management of CYP with Type 2 would be beneficial especially in terms of optimal treatment and education
- Explore how well complications are being prevented with a view to potential provision of appropriate support to primary care and patients around education and optimal management
- Target care homes particularly those for Elderly Mentally Infirm with Diabetes education ans support
- Explore how our spend is distributed across emergency transport and community and integrated care to ensure optimal utilisation of available funds
- Explore how to further improve spend per person item on insulin
- Explore how optimal the provision of psychological support to improve outcomes is, especially in patients with Type 2 Diabetes undergoing treatment intensification and Type 1 with very intensive treatment, demanding self-care and increased hypoglycaemia. Also for women and people from lower socio-economic groups.
- Consider incorporating ‘coping skills training’ into education programmes to ensure enhanced wellbeing, optimal self-management and potential fewer complications.

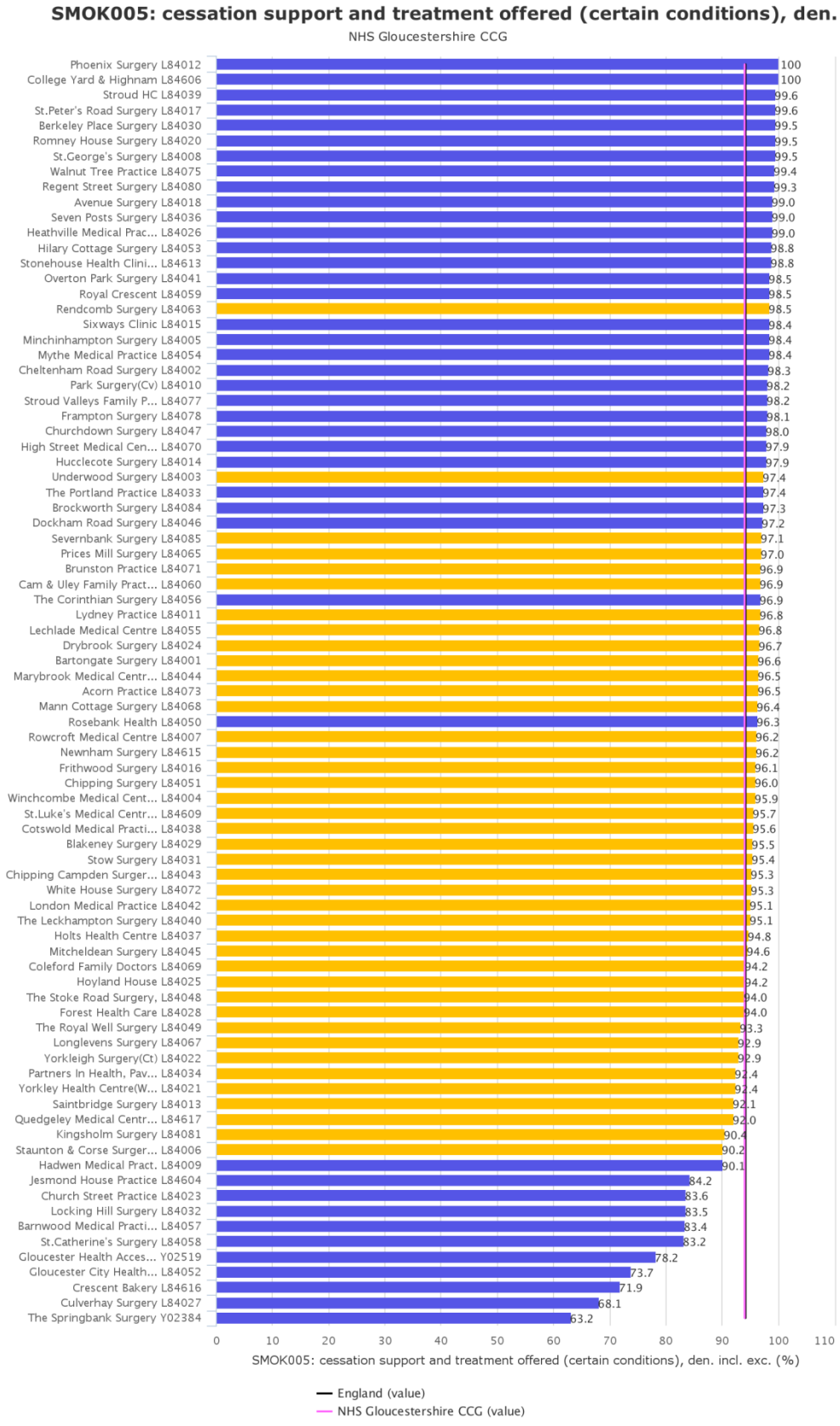
- Review access of CYP to Mental health professionals with an understanding of Diabetes to ensure that this is optimal
- A focus on prevention of obesity is necessary considering its central role as risk factor for Type 2 Diabetes, with potential targeting of groups at higher risk, as well as Forest, Gloucester and Tewkesbury localities. Accessibility to interventions should also be explored.
- Access to 'Slimming World' should be explored to ensure this is optimal in areas and groups with higher need
- The recording of ethnicity needs to be promoted across all providers to enable a better understanding of relative need and outcomes across populations
- Consider prioritising people aged over 40, those with a family history of diabetes, low levels of physical activity and overweight people for accessing lifestyle services with a view to preventing Type 2 Diabetes.
- The CPG should take ownership of required steps the community needs to take in readiness for implementing the NHS DPP to ensure the steps are progressed appropriately
- Consider exploring what the barriers might be to the take up of NHS Health Checks in collaboration with GCC
- Explore how ell the CES is meeting its set objectives with a view to reviewing appropriately
- The performance of the CDT should be explored in terms of measurable outcomes as well as meeting set objectives.
- A review of how well the transition (including the CQUIN) is working for young people transiting to adult care
- Explore how specialist Diabetes nursing provision and specialist pharmacy support can be improved upon in terms of improved outcomes and reduction in prescribing errors
- The ongoing work on diabetes footcare should explore equity of provision versus need across CGH and GRH
- An understanding of needed support for patients presenting as emergencies especially in to GRH would be beneficial. Prevention of ketoacidosis may be an area of initial focus.
- Excess bed days should be explored in terms of ways of reducing this in order to make more effective use of funds, especially for Gloucester and Forest localities
- Hypoglycaemic episodes in hospital especially in GRH need further exploration. Also the use of insulin infusion, as well as medication, prescription and insulin errors.
- The Diabetic Eye Screening service needs more innovative ways to address uptake of retinopathy screening by CYP. The CPG should keep a close eye on their performance around this.
- Consider targeted support fro retinopathy screening in Gloucester locality
- Consider reviewing the emphasis placed on significance of neuropathy and its various presentation within structured education
- Explore if there is scope for improvement in the management of blood pressure in CYP with Diabetes
- There is a need for a better understanding of performance with the three control targets across the two types of Diabetes in GP Practices in general
- Additional support for smoking cessation may be needed especially in GP Practices that are not performing as well as peers

- A review of outcomes in CYP around HbA1c control may be beneficial to see fi we need to target improvements at CYP from more deprived areas as well as those of older age
- Gloucestershire may wish to consider the potential usefulness of having a GPwSI

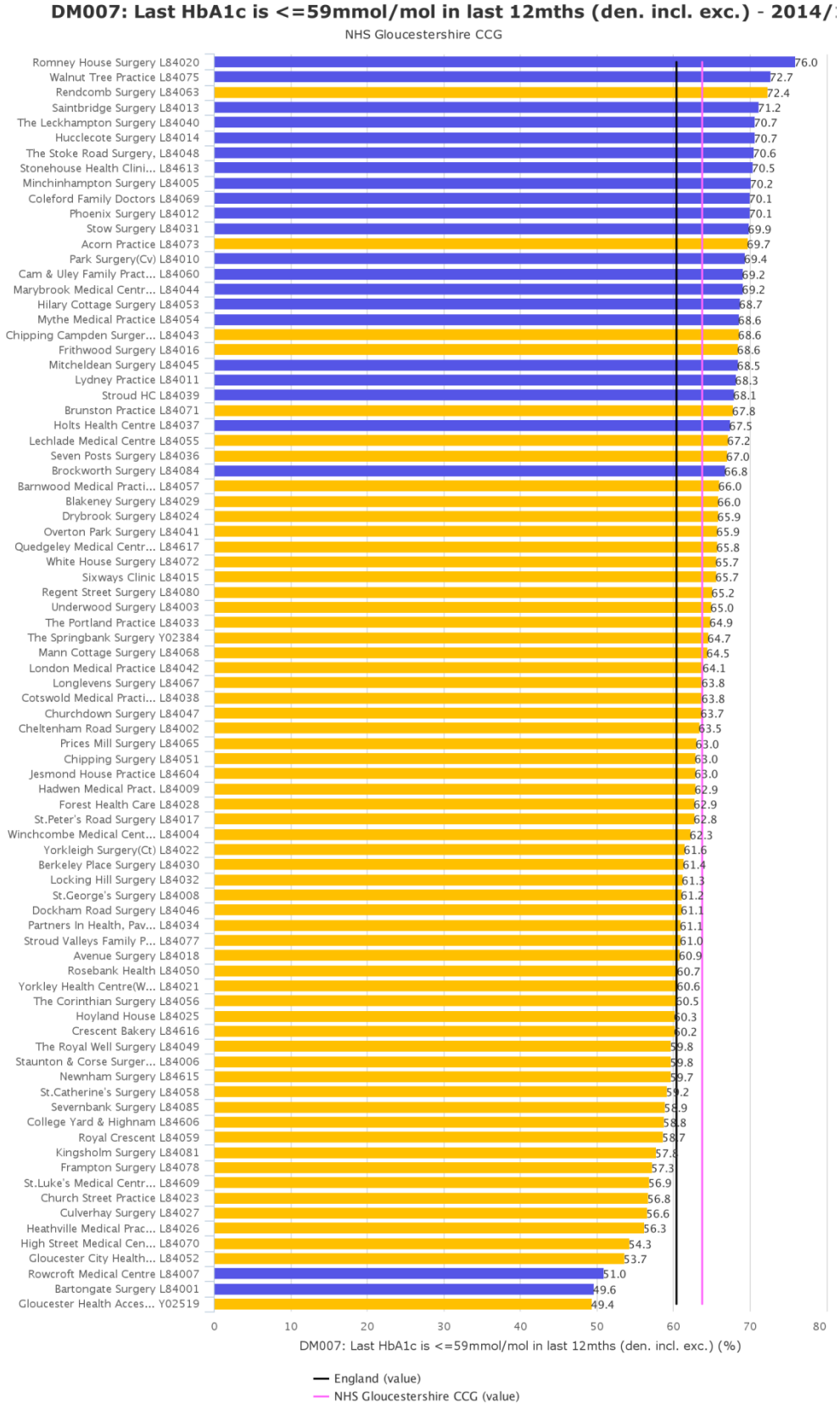
Appendix 1: NHS Diabetes Prevention Programme Patient Pathway



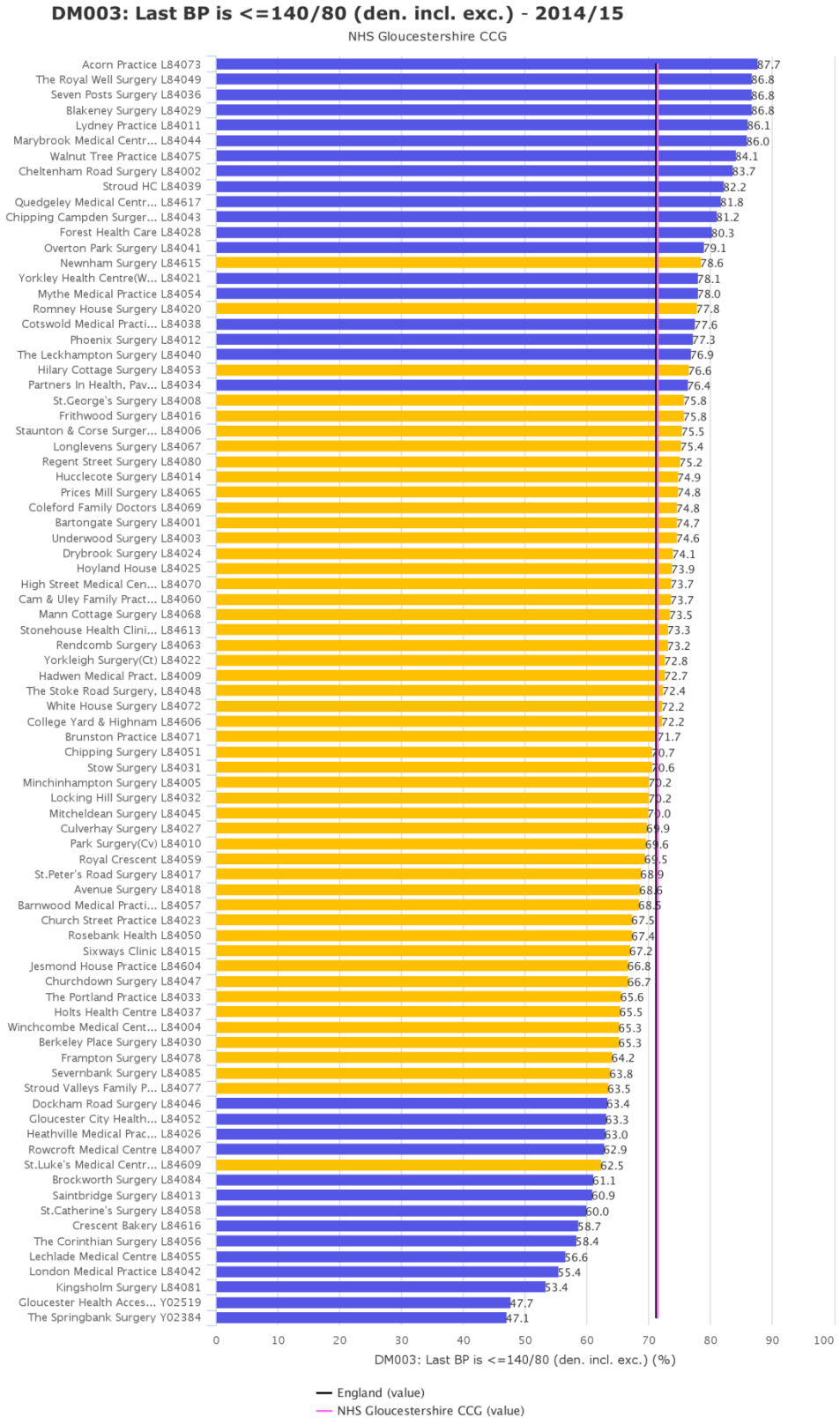
Appendix 2: Smoking Cessation Support and Treatment Offered (Certain Conditions), by GP Practice 2014/15



Appendix 3: Percentage of Diabetic Patients with HbA1c<=59mmol/mol by GP Practice, 2014/15



Appendix 4: Percentage of Diabetic Patients with BP <=140/80, by GP Practice 2014/15



Appendix 5: Percentage of Diabetic Patients with Total Cholesterol (last 12 months) <=5 mmol/l by GP Practice, 2014/15