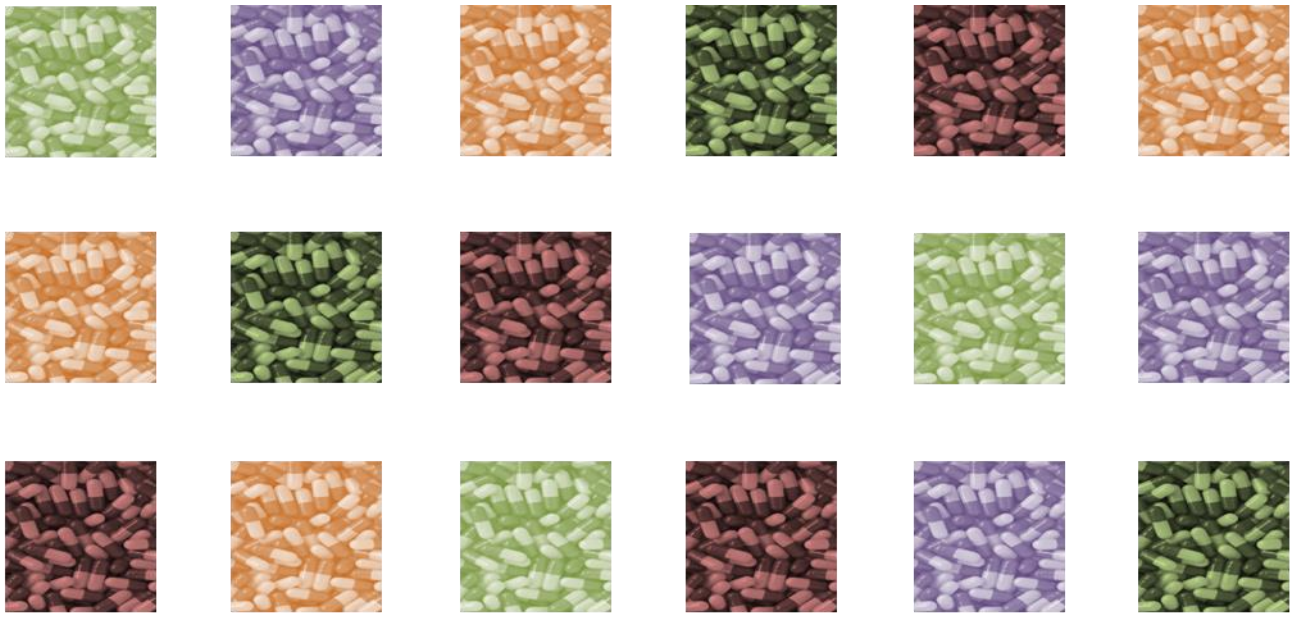
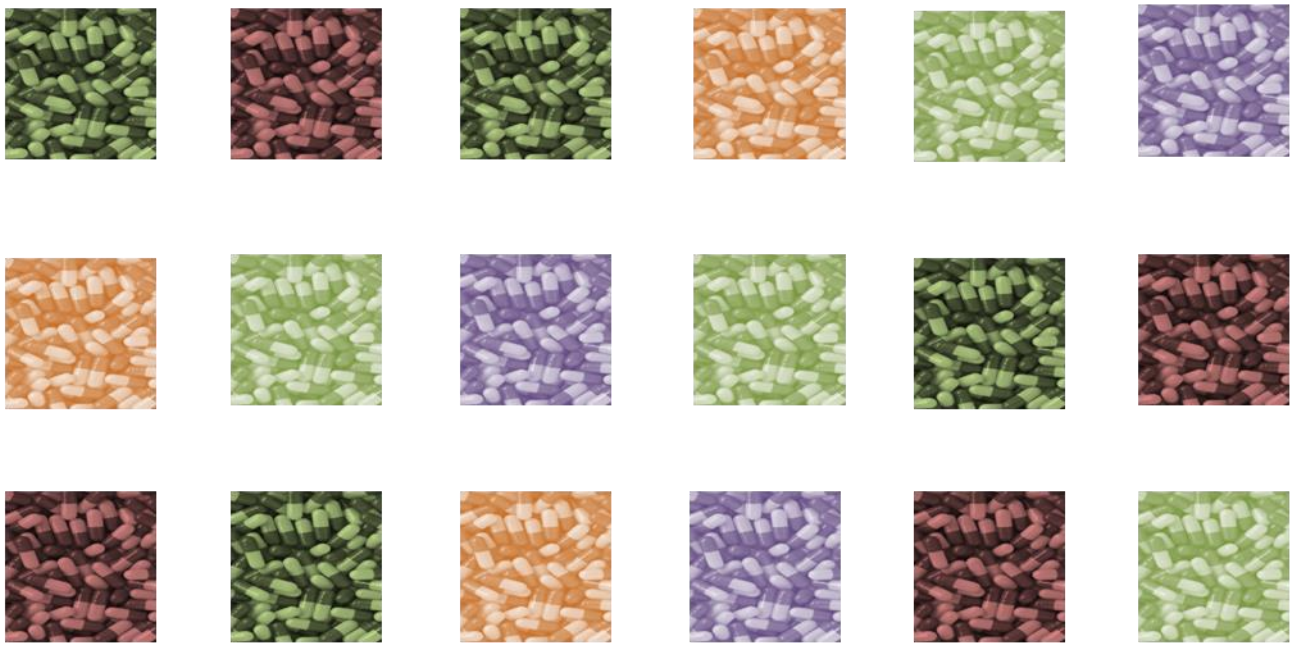


# Quality Prescribing For Diabetes

## A Guide for Improvement

## 2018 - 2021



Scottish Government
Riaghaltas na h-Alba
gov.scot

REALISTIC MEDICINE

NHS SCOTLAND

# Foreword

This guide has been written by The Scottish Government and NHS Scotland to promote high quality prescribing of medicines to treat type 2 diabetes and, equally importantly, non-pharmaceutical approaches to management. The document is aimed at clinicians, local Managed Clinical Networks and Board Medicines Management Teams and builds upon the previous 2014-16 strategy. 4.8% of the Scottish population have type 2 diabetes and there was an increase of 39% between 2007 and 2016. Due to demographic variation, in some Boards, prevalence is as high as 5.5%.

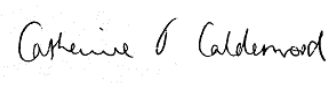
This advice is based on existing clinical guidance, in particular SIGN 116 and 154, which reviewed the clinical evidence for medication for people with diabetes in 2017, and should be considered a companion document. Since the publication of the Diabetes Prescribing Strategy 2014-2016, the classes of medicines and evidence base have developed.

As the demographic makeup of the country changes, with people living longer, and care is refocused towards the community, there is a need to continue to develop our strategic approach to management of long term conditions. *Realistic Medicine (2016)* is a key driver of strategy for NHS Scotland and includes a number of important goals:

- Reducing the burden of overtreatment
- Reducing unwarranted variation
- Ensuring value for money
- Combining the expertise of patients and professionals
- Improving the patient-doctor relationship
- Identifying and managing clinical risk

These goals are significant, and this document aims to support their delivery. It is vital that, alongside pharmaceutical care, there is a focus on education and information to enable patients to make better choices regarding their care. It is recognised that many people in Scotland benefit from pharmaceutical care of diabetes: this guide aims to maximise that benefit and ensure safe, appropriate care.

This guide is welcomed as an opportunity to further improve the care provided to patients. The recommendations are aimed at Clinicians, Boards and GP Clusters, and designed to continue the improvement in provision of care. We are grateful to all those who contributed to the working group and to the review and development of the document.



| Brian Kennon | Alpana Mair | Catherine Calderwood |
|---|---|---|
| National Lead for Diabetes | Head of Effective Prescribing and Therapeutics | Chief Medical Officer |

**Acknowledgements**

The lead authors were Jill Nowell and Jason Cormack

**Working Group**

The working group was established in 2016 and consisted of:

Karen Adamson, Consultant Physician, NHS Lothian
Susan Arnott, GP/ Lead Clinician NHS Lanarkshire Diabetes MCN
Gillian Booth, Diabetes/ Endocrinology Pharmacist, NHS Forth Valley
Jason Cormack, Programme Lead, Therapeutics Branch, Scottish Government
Diana Findley, Patient Representative
Miles Fisher, Consultant Physician, NHS Greater Glasgow and Clyde
Simon Hurding, Clinical Lead, Therapeutics Branch, Scottish Government
Andrew Job, Patient Representative
David Jolliffe, Joint Clinical Lead Diabetes MCN, NHS Lothian
Morag Low, Lead Diabetes Specialist Nurse/Diabetes MCN Coordinator, NHS Borders
Brian Kennon, National Lead for Diabetes, NHS Greater Glasgow and Clyde
Alpana Mair, Head of Effective Prescribing and Therapeutics, Scottish Government
Jill Nowell, Head of the Prescribing Support Unit, NHS Tayside
Paul Paxton, Senior Information Analyst, NHS National Services Scotland
Sheila Tennant, Lead for Prescribing and Clinical Pharmacy (Glasgow City), NHS Greater Glasgow and Clyde
Pamela Young, Diabetes Nurse Specialist, NHS Dumfries and Galloway

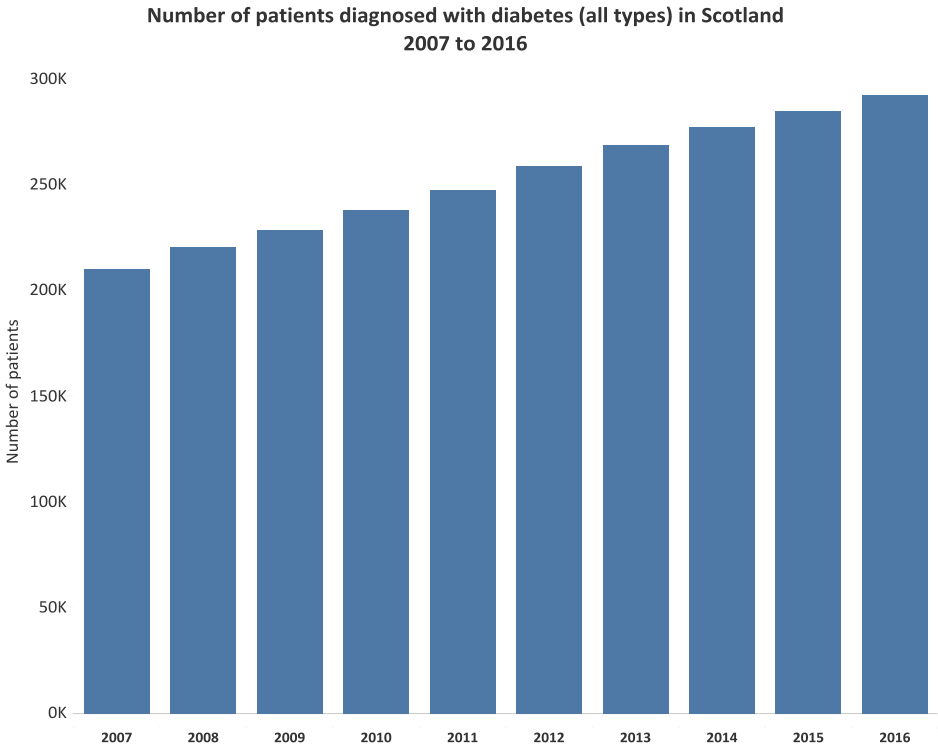
**With thanks to:**

Jake Laurie, Project Support Officer, Therapeutics Branch, Scottish Government
Sean MacBride-Stewart, Medicines Management Resources Lead, NHS Greater Glasgow and Clyde
The SCI-DC Analysis Team

# Contents

# Introduction and Rationale

Patients with type 2 diabetes make up 4.8% of the population in Scotland.[1] Between 2007 and 2016, the number of people diagnosed with diabetes in Scotland has risen from 210,000 to 292,000, an increase of 39%.[2] It is estimated that by 2028 there will be a further 254,000 people with type 2 diabetes.[3] There is also likely to be a significant number of people whose diabetes is undiagnosed. Variation in the prevalence estimates between Boards (range 4.2% to 5.5%)[4] can be explained by factors including demographic differences, deprivation and ethnic distribution. There are a range of new pharmaceutical therapies and devices available each year.




Driven by the pace of change, SIGN updated their guidance on *Pharmacological Management of Glycaemic Control* in 2017. There have been recent developments in the classes of medicine available, for instance SGLT-2 inhibitors, as well as advances in evidence, particularly around cardiovascular benefits and glycaemic control. Until 2010, the majority of clinical trials focused narrowly on glucose control, the risks of weight gain and hypoglycaemia, rather than on cardiovascular morbidity and mortality. Several large cardiovascular outcome trials have been published comparing individual glucose-lowering agents with "standard care".[5]

[1] Scottish Diabetes Survey 2016
[2] ISD 2017 – 90% of people with diabetes have type 2 diabetes
[3] Chronic Disease Intelligence to Optimise Service Planning in Scotland – July 2017
[4] www.Diabetesinscotland.org.uk/Publications/SDS2014.pdf
[5] SIGN 154 – Pharmacological Management of Glycaemic Control in people with Type-2 Diabetes - 2017

Changes in prescribing are anticipated, in line with evidence - an expected increase in use of medicines with cardiovascular benefit and a reduction in use of drugs without evidence of benefit beyond glycaemic control.

High quality prescribing involves:

- The appropriate selection of therapies for an individual patient.
- Review of dosage and side effects.
- Consideration of when a treatment is no longer effective and should be stopped.
- Clarity about the advantages and disadvantages of any treatment.

Type 2 diabetes is a serious and commonly progressive condition that usually requires increasing intensity of therapy. This fact creates an even greater challenge to the potential withdrawal of therapies that might not continue to be effective. A trial of stopping a medicine, with careful monitoring, should be considered when there are doubts regarding the continuing benefit to the patient.

The Scottish Care Information Diabetes Collaboration (SCI-DC) product supports the needs of patients by providing clinical information, support for diabetes screening services and provides data for national and local audit programmes. It provides a fully integrated, shared electronic patient record to support the treatment of patients with diabetes.[6]

It is recognised that the recommendations within this document cover the majority of antidiabetic drugs prescribed for those with type 2 diabetes in Scotland. It is also recognised that there will be individual patients who require different treatment.

*What is the purpose?*

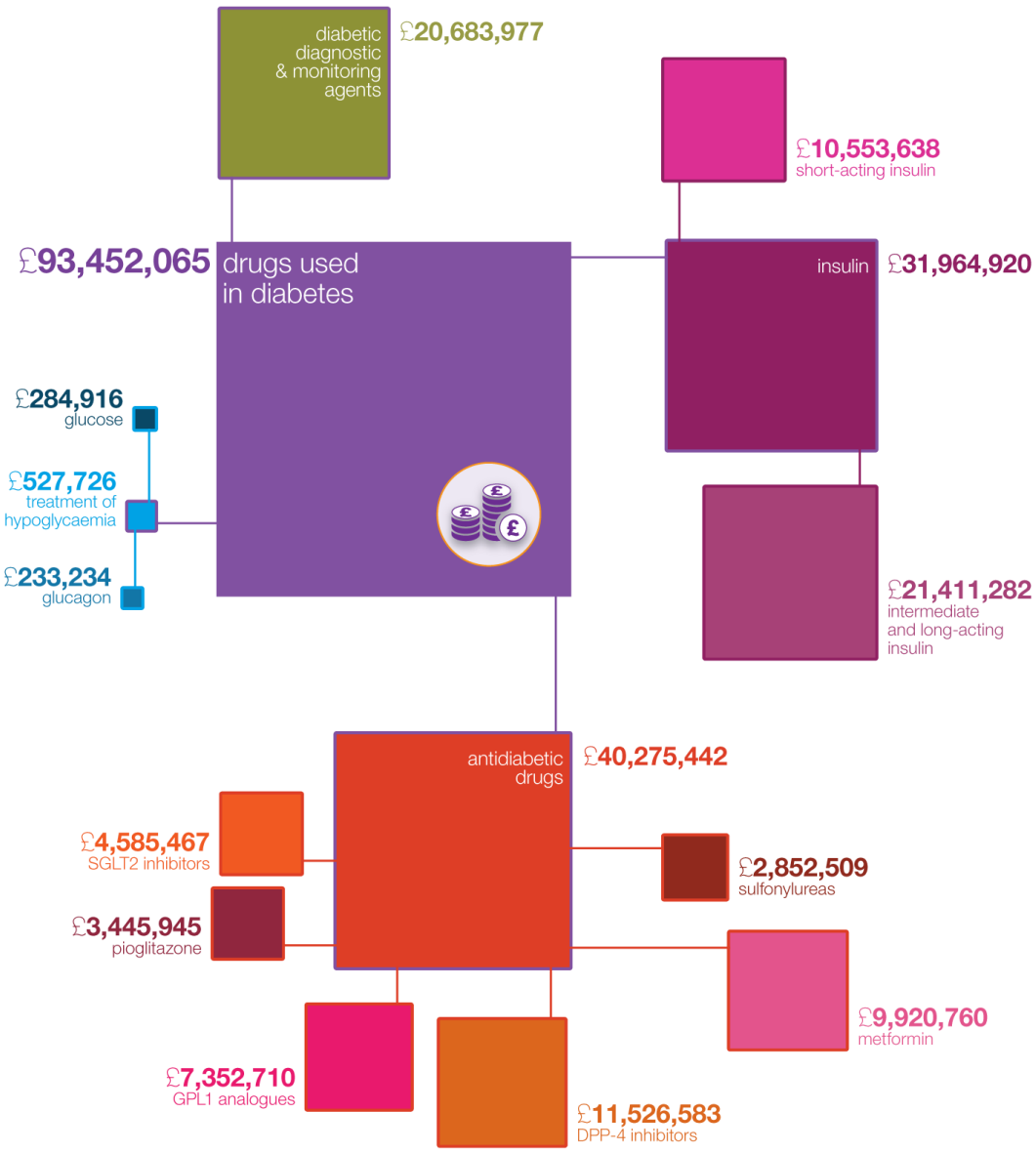
The purpose of this guide is to promote high quality prescribing in type 2 diabetes, focussing on safe, person-centred care. This is particularly relevant, given that there is a wide variation in $HbA_{1C}$ control in Scotland, and some 41% of people with type 2 diabetes have an $HbA_{1C}$ of greater than 58 mmol/mol, which is above the recommended target.[7,8]

In addition, it will raise awareness of the non-pharmaceutical management of type 2 diabetes, provide information that can be used to monitor and review the use of agents and explore variation across Scotland. The scope includes adult patients with type 2 diabetes only. The document does not replace current clinical guidance and should be read alongside SIGN 116 and 154. Specific aspects of this document have been written with a view to supporting policy on a Single National Formulary for Scotland. The document also helps to support the enhanced clinical role of Pharmacists, as detailed in Achieving Excellence in Pharmaceutical Care.

[6] www.sci-diabetes.scot.nhs.uk
[7] Scottish Diabetes Survey 2016
[8] SIGN 116

*Why is this important?*

The graph below shows the relative spend on diabetes medicines and classes. Boards should reflect on the relative split of this spend. Diabetes medicines make up some 8% of the total spend on medicines in primary care in Scotland.[9]




4.8% of the Scottish population have type 2 diabetes. Due to demographic variation, in some Boards, the prevalence is as high as 5.5%.[10]

Given the significant prevalence of type 2 diabetes in Scotland, the escalation seen over the last ten years and the variation in both volume and spend on medicines, it is important to ensure a national focus.

[9] ISD 2017 – Note: data relates to prescribing for both type 1 and type 2 diabetes. January to December 2016.
[10] www.Diabetesinscotland.org.uk/Publications/SDS2014.pdf

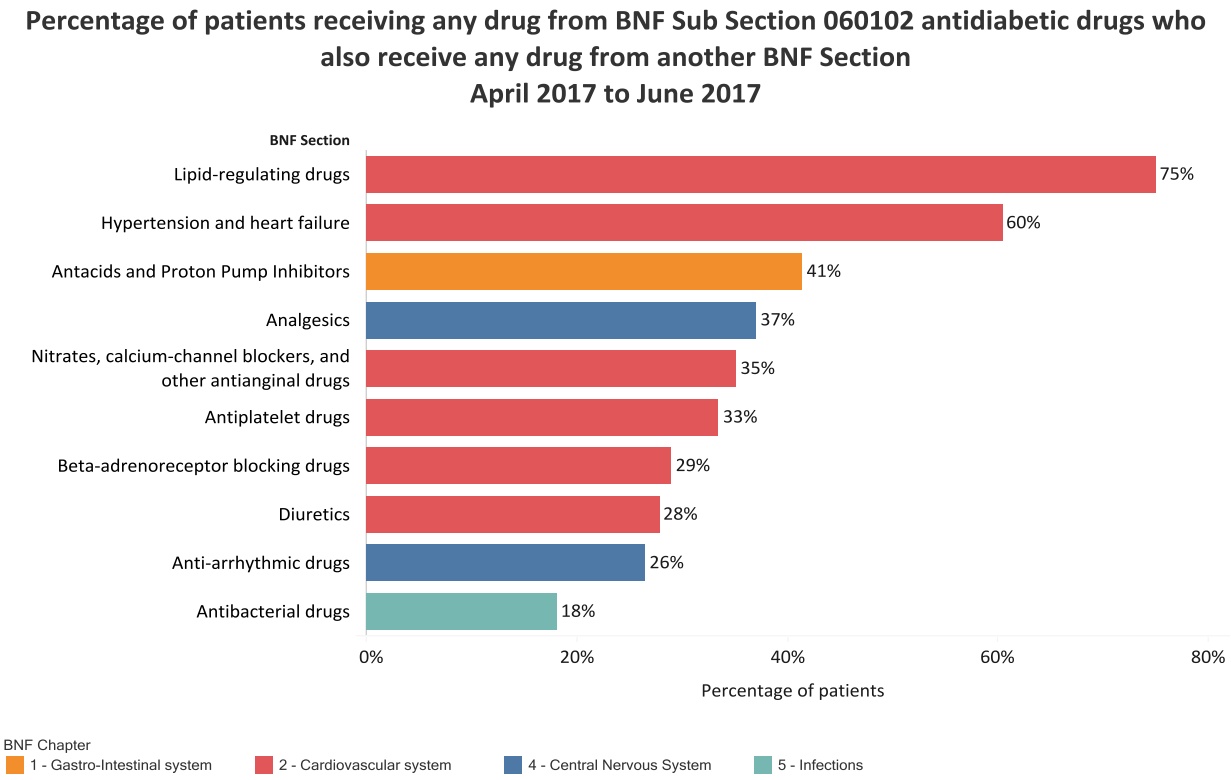
*What are the benefits to patients?*

The document promotes a focus on diabetes prescribing leading to structured review of the appropriateness, efficacy and tolerability of treatment, and therefore promoting optimal care. Through consideration of non-pharmaceutical management, there is the potential to reduce medication burden on patients and the associated risk of short and long term adverse effects.

The positive impact felt by patients from their diabetes medicines is acknowledged, although meaningful, patient oriented outcome data is not readily available. The organisation continues to work on this area.

In line with international evidence, there is a general shift away from a single system approach to medicines strategy, and it is therefore important to consider this document in the broader context of *Polypharmacy Guidance* and a holistic approach to care. It is important that any guide ensures that recommendations are comprehensible, based on current guidance and are patient focused. It must be accepted that guidelines are written to provide general advice and there will be some patients who require a more bespoke approach.

The chart below serves as an illustration of the increased medication burden faced by patients with diabetes.



*What are the benefits to Clinicians?*

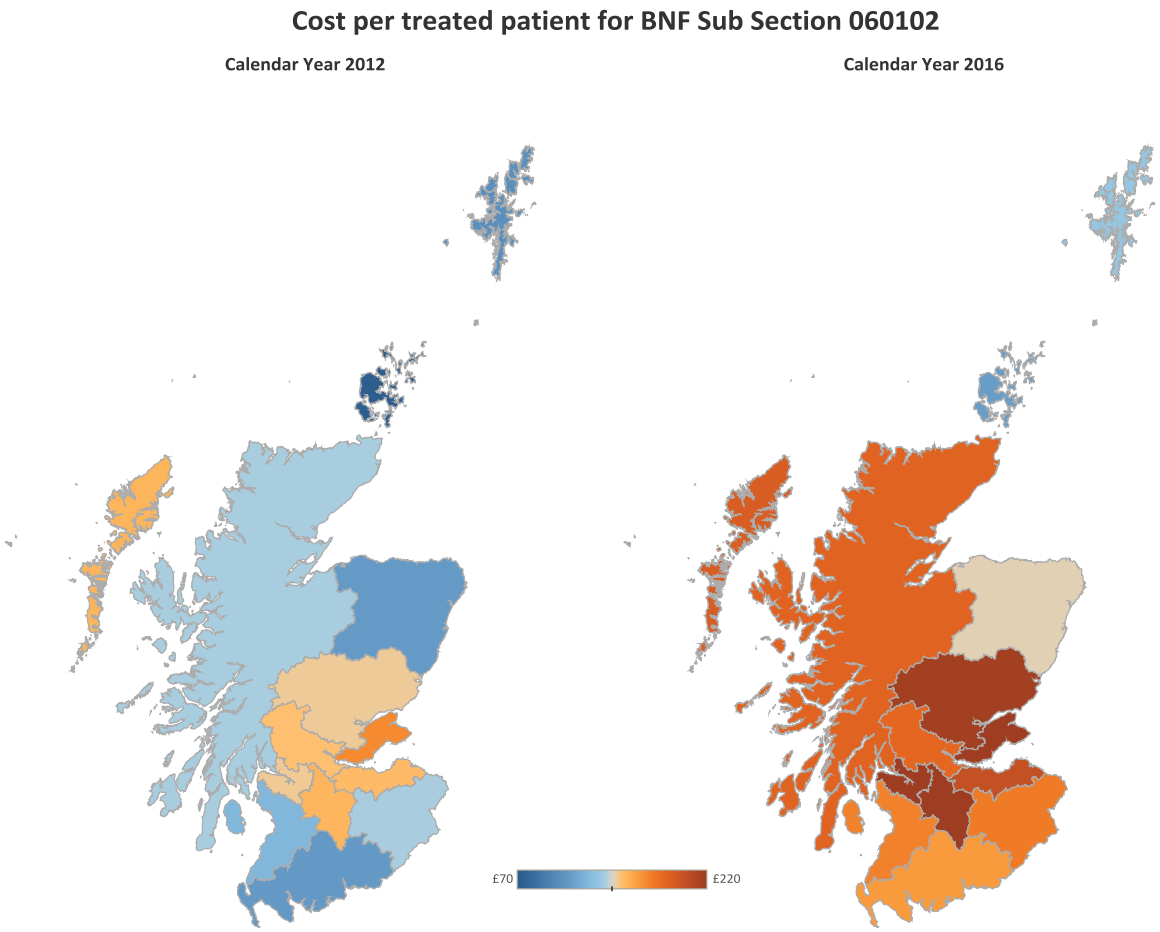
This document provides a practical toolkit and examples of high quality approaches to care. This includes case studies, structure for review and links to additional resources.

*What are the benefits for Boards?*

Included is a suite of data indicators which can help focus resources on areas which need review. Case studies provide examples of how to implement improvements in diabetes prescribing.

The maps below show the measure of cost per treated patient, which is the total spend on diabetes medicines (BNF Sub Section 060102) dispensed in a calendar year, divided by the total number of patients receiving one or more of these medicines.

This demonstrates an increase in cost per treated patient across the country, as well as the variation in this metric between Boards.

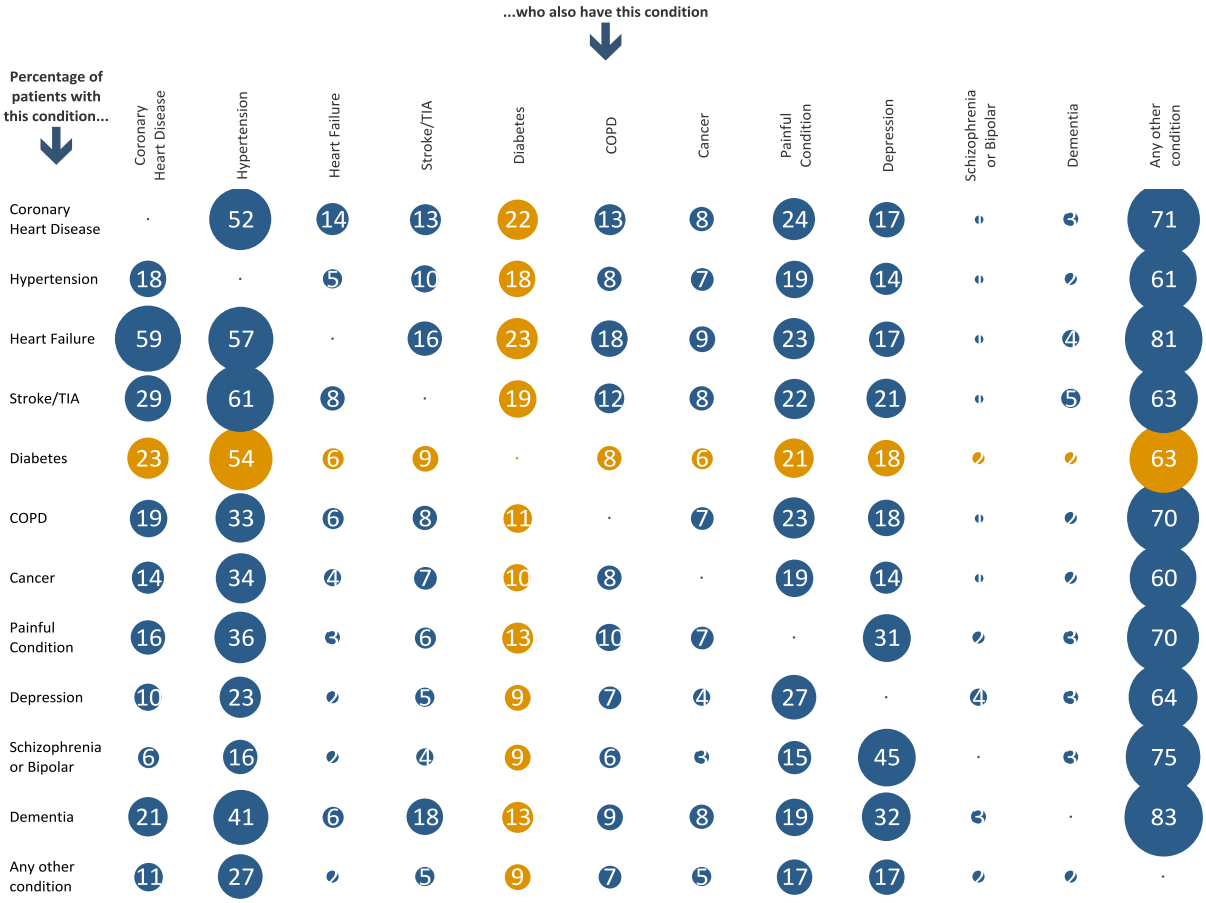


# Polypharmacy Guidance

Medication is by far the most common form of medical intervention, with 300,000 prescriptions issued every day in Scotland. The term polypharmacy itself just means “many medications” and has often been defined to be present when a patient takes five or more medications. However, it is important to note that polypharmacy is not necessarily a bad thing. Polypharmacy can be both rational and required. It is therefore crucial to distinguish appropriate from inappropriate polypharmacy. Inappropriate polypharmacy is present, when one or more drugs are prescribed that are not or no longer needed.[11]

The latest Scottish Government guidance can be found here.

Over half of all people in Scotland with chronic conditions have two or more conditions.[12] The chart below indicates the relative co-prevalence of selected conditions.[13]

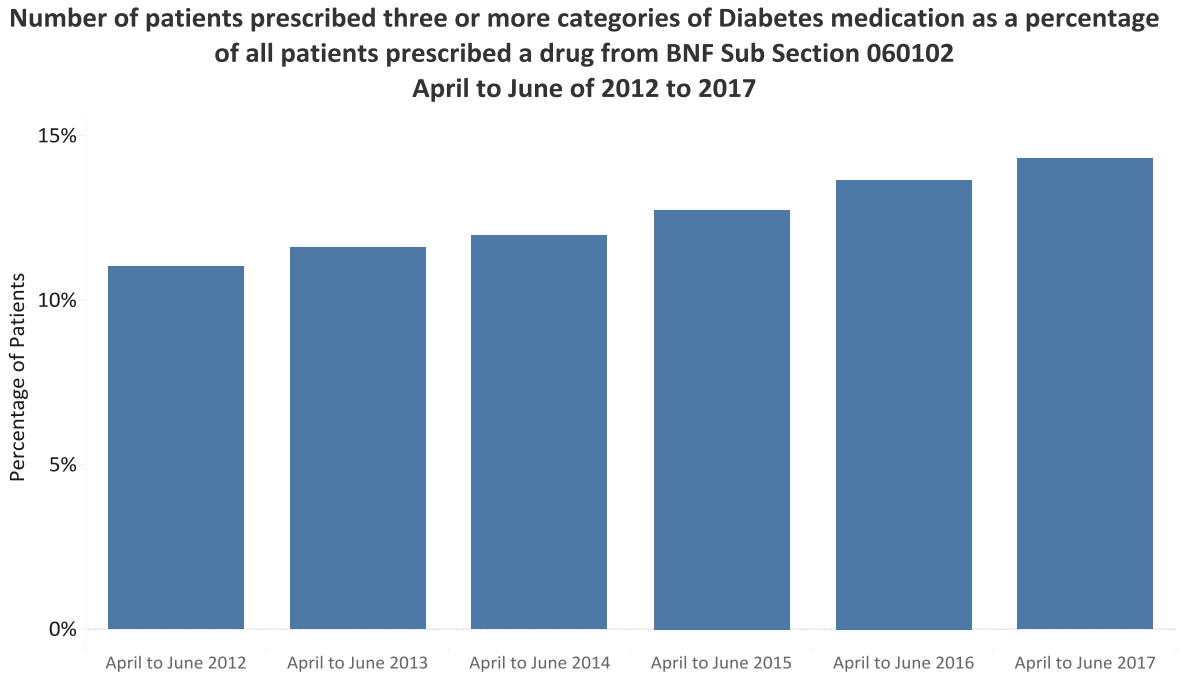



Ultimately, all patients on multiple medications should be reviewed with a polypharmacy and holistic approach in mind.

[11] Polypharmacy Guidance 2015, Scottish Government
[12] Barnett K, Mercer SW, Norbury M, Watt G, Wyke S, Guthrie B. The Lancet;380(9836):37-43
[13] Mercer, Guthrie, Wyke: Scottish School of Primary Care

**Polypharmacy in diabetes**

The chart below shows the increasing trend of patients being prescribed multiple medicines for diabetes. This reflects the availability of additional categories of medicines and options of pharmaceutical care. While this prescribing will very often be appropriate, the chart serves to demonstrate the amount of medicines patients are prescribed.



# Key Recommendations

## Clinicians should…

**Develop a clear management plan** collaboratively with patients, including regular review dates, realistic targets and treatment goals. Expectations should be addressed and clarified. The plan should focus on *what matters to you*.

**Pursue non-pharmaceutical approaches** wherever possible, either alone or in conjunction with medicines. Self-management should be actively encouraged, supported and included in the management plan.

**Follow a clinically appropriate approach to initiation of medication**, discussing risks and benefits and incorporating agreed criteria for stopping/continuing medication.

**Review effectiveness, tolerability and adherence** on a regular basis. Medicine burden should be reduced where possible, in line with *Polypharmacy Guidance*. The SCI-DC Prescribing Timeline Function is a useful tool to inform reviews.

## Boards should…

**Consider the guidance** within this document alongside the data provided on relative prescribing positions and trends. Prescribing action plans set out local priorities for how Boards will continue to improve quality of medicines management – these action plans should, where appropriate, encourage use of this document to drive that improvement.

**Nominate local leads** (eg. one medical and one within, or with strong links to, the Medicines Management Team, or equivalent). The leads should work closely together to drive delivery and implementation of the recommendations within this document. It is crucial to engage with the local MCN and clinicians across all sectors.

**Review local prescribing pathways** and support clinicians, based on updated SIGN guidance.

**Ensure the primary/secondary care interface is appropriately developed**. Given the considerable influence that local secondary care prescribing culture has on primary care clinicians, it is vital to ensure engagement with secondary care clinicians.

**Ensure non-pharmacological management is promoted** within prescribing action plans

## GP Clusters should…

**Engage with local Prescribing Support Teams** to review data and consider utilising a Quality Improvement based approach to delivering change.

# General Principles of Prescribing for Type 2 Diabetes

| Principles for prescribing for patients with type 2 diabetes | |
|---|---|
| **Principle** | **Action** |
| Person-centred care | The clinician and patient should discuss individualised glycaemic targets, prevention of long term complications, and goals of care. Management of other risks, such as cardiovascular complications, should be discussed. |
| Pathways | Follow local prescribing guidelines and SIGN 116 & 154. Prescribers should be aware of current SMC advice on the range of agents. |
| Self-Management | Clinicians should have the appropriate skills and training to educate and motivate patients. Patients should be signposted to, and encouraged to enrol in, My Diabetes My Way. It is important that patients understand the nature of their condition and the need to comply with their medicines regimen. |
| Education | Around 87% of people with type 2 diabetes in Scotland are overweight or obese,[14] patients should be encouraged to attend local structured education, including both diet and exercise, and an activity referral made, if appropriate. |
| Timely Review | Any drug initiated should be reviewed after 3 months with the patient and titrated appropriately. After dose titration it should be stopped if the adverse effects outweigh the benefits. A holistic polypharmacy approach is recommended. |
| Ongoing Review | Review should occur at least every six to twelve months. Review ongoing need, effectiveness and side effects of medication. Use local prescribing guidelines to select a cost effective choice. SCI-DC timeline information is valuable in ongoing review. The patient should be aware of the systems available to obtain ongoing supplies of medication. |
| Effective Care | Individualised glycaemic targets should be adopted. Ensure prescribing instructions state the appropriate times for taking medication and patients are aware of these. |
| High Risk Groups | Clinical judgement must be utilised when prescribing for high risk patients i.e. frail, women of childbearing age, renal impairment, hepatic impairment, patients unable to self-care, patients with existing cardiovascular disease. |

[14] www.diabetesinscotland.org.uk/Publications/SDS2015.pdf

# Guidance for Clinicians

The aim of this document is to support NHS Boards, GP Clusters and clinicians to devise strategies to optimise prescribing, reduce harm and to reduce unwarranted variation. There are three key principles which prescribers should follow:

- The approach should assist the patient to achieve goals which have been identified and developed in partnership through the *what matters to me principle*. The management plan will be individual to each patient and should place the patient at the centre.
- Prescribers should work with patients to develop an understanding of the importance of self-management to the successful achievement of goals. Self-management does not mean that the patient is expected to deal with matters on their own – rather it is about developing skills and knowledge so that they can be confident to manage their condition. This would include aspects such as *Sick Day Rule* guidance and lifestyle changes.
- Difficult and honest conversations may be required to communicate the importance of self-management and the benefits of lifestyle changes, which can often be of similar or greater benefit than medication, in treating type 2 diabetes. The importance of the patient's psychological state and willingness to change should not be underestimated.

Lifestyle changes are advised for all people with type 2 diabetes. This can help minimise the risk of developing complications. The recommended lifestyle interventions include:[15]

- Eating a healthy, balanced diet following advice from clinicians, which may include:
    - Replacing refined carbohydrates with wholegrain foods
    - Increasing intake of vegetables and other foods high in dietary fibre
    - Reducing the amount of saturated fat and sugar in the diet

Advice for patients is available from Diabetes UK and British Dietetic Association websites.

- Losing weight to achieve and maintain a healthy body mass index.
- Drinking alcohol only in moderation.

Advice on the alcohol, sugar and calorie content of alcoholic drinks, which can be helpful for patients with diabetes, is available from Drink Aware.

- Taking plenty of regular exercise, for adults two and a half hours each week of moderate to vigorous physical activity, adding in muscle strengthening activity twice a week.
- All patients who smoke should be advised to stop and offered support.

[15] www.nhsinform.scot/illnesses-and-conditions/Diabetes/type-2-Diabetes

Morbidity and mortality from cardiovascular disease (CVD) are two to five times higher in people with diabetes. Therefore, as well as lifestyle modification and treating hyperglycaemia, other risk factors, particularly cardiovascular risk, should be managed according to SIGN 116.

- Hypertension should be treated aggressively with lifestyle modification and drug therapy.
- Lipid-lowering drug therapy is recommended for primary prevention in patients with type 2 diabetes aged >40 years regardless of baseline cholesterol. Follow local formularies and guidance.

Patients can find it difficult to accept that diabetes is a lifelong condition. Managing the lifestyle changes, which may be associated with the condition, can be a challenge. It is important that patients understand what alterations to make to their medication when they experience a period of illness. Information is available within Polypharmacy Guidance.

SIGN 116 recommends that patients with type 2 diabetes be offered psychological interventions (including motivational interviewing, goal setting skills and CBT) to improve glycaemic control in the short and medium term. Interventions aimed at dietary change are more likely to succeed if a psychological approach based on a theoretical model is included.

**Case Study – Patient level – Psychology and self-care**

**Key Learning**
The importance of a holistic, person-centered approach to care.

**The Components**
A male patient, aged 48, was diagnosed with type 2 diabetes following a new patient medical in 2004. He was referred to an acute based diabetes clinic where he received new patient education and was prescribed metformin. He was reviewed 6 monthly and the metformin was titrated up to the maximum dose. His weight increased over a period of 8 years, from 102 to 140 kg. Rosiglitazone and liraglutide were prescribed in addition to metformin. Enalapril was used to manage high blood pressure and a statin to reduce cholesterol.

Throughout this period the patient's psychological health impacted his ability to self-manage his condition. Whilst he knew the benefits that improved self-management would bring, there was a lack of motivation to make the required lifestyle changes. This was due to deteriorating self-esteem, and was exacerbated by his ongoing weight gain creating a cycle of being unhappy at being seen in public which contributed to a lack of exercise. His weight peaked at 146 kg with a BMI of 43 and an $HbA_{1c}$ never below 53 mmol/mol (7%). Initial appointments with dietetic services did not provide any psychological support advice and did not engage the patient sufficiently to make behavioural changes.

At this point, two triggers focussed the patient's desire for change. Firstly, a family wedding caused a realisation of the significance of his weight gain. Secondly, his doctor was considering prescribing insulin. He was displaying signs of depression, despite not being diagnosed, and, although he was still at work, his social life suffered.

In 2014, the patient underwent a bariatric process, including food psychology, dietetics and a gastric sleeve. Over the following year, the patient lost 51 kg and by December 2015 was no longer medicated for any condition. His $HbA_{1c}$ reduced from 70 mmol/mol (8.5%) to 42 mmol/mol (6%) and blood pressure normalised. The patient reports that psychological techniques, including challenging the need for foods, have been of significant help. His lifestyle has improved dramatically, now including regular exercise. Care is now managed by the GP practice with regular nurse appointments, which are valued.

**The Benefits**

The patient highlighted a number of important factors which contributed to both his diabetes management and improved general health. Initial dietetic interventions did not help in this case as the information was not pitched at the right level, as he already had a good knowledge of diet and food groups. This highlights the importance of a patient-centered approach.

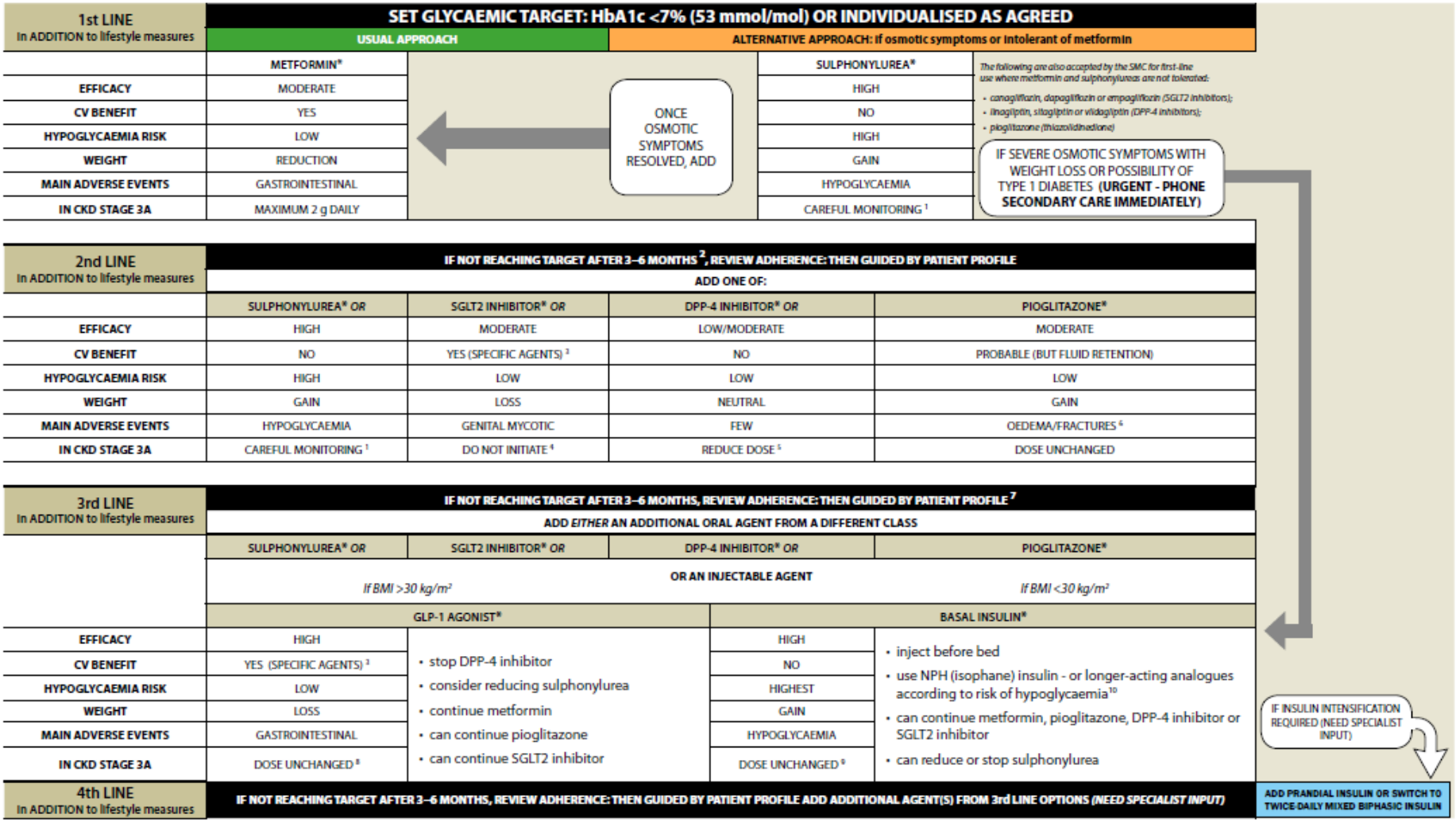
Understanding the consequences of the condition to his family life was a key catalyst in a change of attitude to making lifestyle changes, as was the explanation of the medicines (in this case, insulin). The patient would have been unlikely to change his lifestyle, even with the surgical intervention, without these trigger points.

Successfully maintaining a healthier lifestyle and managing the condition, has required a fundamental change in his behaviour, particularly his relationship with food. The psychological aspects of this improvement should be noted.

The table overleaf provides key guidance on major type 2 diabetes medicines (extracted from SIGN 154) and highlights information around cardiovascular outcomes. In patients with pre-existing cardiovascular disease, or those at particularly high risk, it is appropriate for choice of therapy to take into account the results of recent clinical studies which have shown a significant benefit on cardiovascular outcomes with some individual blood glucose lowering drugs. Drugs with such evidence at time of writing are metformin, empagliflozin, canagliflozin and liraglutide. Further studies on cardiovascular outcomes with other blood glucose lowering drugs are expected to publish over the next 2 years and may influence future prescribing.

Clinicians should be aware that different agents within the same drug class, may have different licensed indications. It is important to review this information when prescribing. This is a rapidly developing field and further change is expected over the coming years.

*Algorithm copied directly from [SIGN 154]



## Prescribing for High Risk Groups

Clinical judgement must be utilised when prescribing for high risk patients i.e. frail, women of childbearing age, renal impairment, hepatic impairment, patients unable to self-care, patients with existing cardiovascular disease. Clinicians should be aware of the need to adjust prescribing in patients with diabetes and chronic kidney disease. Refer first to BNF and SPCs. The table below provides guidance.

| **Diabetes and CKD** | | | | |
|---|---|---|---|---|
| **Drug/eGFR** | **<30 ml/ min/ 1.73m$^2$** | **30-44 ml/ min/ 1.73m$^2$** | **45-59 ml/ min/ 1.73m$^2$** | **>60 ml/ min/ 1.73m$^2$** |
| Metformin | STOP | Dose reduction | OK | OK |
| Sulfonylureas | STOP | Dose reduction | Dose reduction | OK |
| Pioglitazone | OK * | OK | OK | OK |
| **DPP-4 inhibitors** | | | | |
| Alogliptin | Dose reduction | Dose reduction | Dose reduction | OK |
| Linagliptin | OK | OK | OK | OK |
| Sitagliptin | Dose reduction | Dose reduction | OK | OK |
| Saxagliptin | STOP | Dose reduction | Dose reduction | OK |
| Vildagliptin | Caution | Dose reduction | Dose reduction | OK |
| **GLP-1 agonists** | | | | |
| Dulaglutide | STOP | OK | OK | OK |
| Exenatide SR | STOP | Dose reduction | Dose reduction | OK |
| Exenatide MR | STOP | STOP | STOP | OK |
| Liraglutide | STOP <15 ml/ min | OK | OK | OK |
| Lixisenatide | STOP | Caution | OK | OK |
| **SGLT-2 inhibitors** | | | | |
| Canagliflozin | STOP | STOP | Dose reduction or don't initiate | OK |
| Dapagliflozin | STOP | STOP | STOP | OK |
| Empagliflozin | STOP | STOP | Dose reduction or don't initiate | OK |

* Pioglitazone is not recommended for use in patients on renal dialysis

Careful consideration should be given when prescribing for women who are planning a pregnancy or may become pregnant. Comprehensive information on managing medicines in women with diabetes planning a pregnancy, is contained within SIGN 116.

Tight glycaemic control may increase the risk of hypoglycaemia. In frail patients, especially those with co-morbidities, it will often be appropriate to adjust the target HbA1c. Clinicians should take care when prescribing for frail patients. The key issues surround weight loss, renal function and cognitive decline, which increase the risk of side effects. The benefits of preventative cardiovascular medicine in this group should be carefully considered as time to derive clinical benefit from tight glycaemic control may be unrealistic. Clinicians should refer to Polypharmacy Guidance when prescribing.

## Self-Monitoring of Blood Glucose (SMBG) for Type 2 Diabetes

SMBG is not generally recommended in management of type 2 diabetes, with appropriate exceptions and information detailed below. NICE guidance is referenced below – expert views suggest that this source has been more recently reviewed than SIGN 116.

Do not routinely offer SMBG for adults with type 2 diabetes unless:

- the person is prescribed insulin, or
- there is evidence of hypoglycaemic episodes, or
- the person is on oral medication that may increase their risk of hypoglycaemia while driving or operating machinery, or
- the person is pregnant, or is planning to become pregnant. For more information, see SIGN or NICE guidelines on diabetes in pregnancy.

Take the Driver and Vehicle Licensing Agency (DVLA) *At a Glance Guide* to the current medical standards of fitness to drive into account when offering self-monitoring of blood glucose levels for adults with type 2 diabetes.

Consider short-term SMBG in adults with type 2 diabetes (and review treatment as necessary):

- when starting treatment with oral or intravenous corticosteroids, or
- to confirm suspected hypoglycaemia, or
- people who have recently been found to have very poorly controlled diabetes and where treatment is being escalated, generally under guidance from a specialist.

Be aware that adults with type 2 diabetes who have acute inter-current illness are at risk of worsening hyperglycaemia. Despite this, metformin should be stopped when inter-current illness causes dehydration. Review treatment as necessary. Clinicians should refer to local formularies to select SMBG.[16]

[16] NICE 2017

## Individual Patient Case Studies

The following two case studies from NHS Forth Valley and NHS Greater Glasgow and Clyde demonstrate that by making person centred clinical decisions for individual patients, the management of their diabetes and associated conditions can be improved.

**Case Study – NHS Forth Valley**

**Key learning**
Impact of medication changes on a patient.

**The Components**
A female patient, aged 55 was referred to the pharmacist led diabetes clinic based in Forth Valley Royal Hospital. She had type 2 diabetes ($HbA_{1c}$ of 112 mmol/mol), hypertension (uncontrolled BP of 170/78), asthma, diabetic nephropathy and chronic kidney disease. She was prescribed 20 different medicines.

The key issue for the patient was problems with medicines adherence. This made it difficult for the pharmacist to identify which medicines were effective for the patient.

The pharmacist discussed the possibility of a medicines compliance device with the patient and assessed her as suitable for a trial. The pharmacist liaised with the GP, practice based pharmacist and community pharmacist to facilitate a positive patient experience.

As part of the holistic care for the patient, the pharmacist also advised on glycaemic management, diet and lifestyle.

**The Benefits**
At the next clinic appointment, the pharmacist was able to better assess the patient's response to the medicines for her hypertension and hyperglycaemia.

Her blood pressure was now controlled and the antihypertensives were able to be reduced, therefore decreasing the polypharmacy burden for the patient.

Established relationships with the GP practice allowed changes to medication to be actioned promptly.

After 3 months of being seen at the pharmacist led clinic the patient had improved BP (144/90) and $HBA_{1c}$ (90 mmol/mol) levels.

**Case Study – NHS Greater Glasgow and Clyde**

**Key learning**

Impact on patient care from pharmacist led clinic for targeted patient groups.

**The Components**

A female patient aged 45 was referred by a GP to a pharmacist run diabetes clinic in primary care. She had poorly controlled type 2 diabetes ($HbA_{1c}$ of 107mmol/mol), hypertension (BP of 130/80) and was obese at 90.7 kg (BMI 30). She hadn't been attending her review appointments. She was prescribed 3 different categories of antidiabetic drugs: Metformin 1 g twice daily, Exenatide 10 mg twice daily and Sitagliptin 100 mg daily. (Evidence and expert opinion suggests that the combination of a GLP1-agonist and a DPP4-inhibitor may be inappropriate).

The key issue for the patient was a problem with compliance with Exenatide. She often forgot to take the second dose and found remembering to take the dose before meals a challenge. The pharmacist discussed the possibility of a once daily injection with her and she agreed this would be more convenient. She was also happy to stop taking Sitagliptin.

The pharmacist had a conversation with the patient's Diabetes Consultant to discuss the proposal to stop the Sitagliptin, and change the Exenatide to the once daily Liraglutide 600 micrograms daily increasing to 1.2 mg. He agreed this was a sensible treatment plan.

As part of the holistic care for the patient, the pharmacist also advised on diet and exercise. The patient's main concern was her weight and was motivated to lose some weight. She discussed if there were any small changes she could make in her day to day life to enable weight loss and agreed to cut out crisps from her current diet. She agreed to a 2 kg target weight loss before her next appointment.

**The Benefits**

When the patient was seen again at 4 months, her $HbA_{1c}$ had improved to 62 mmol/mol. The patient had lost a little weight and her BMI had reduced to 28.2. She was now managing her Liraglutide once daily and taking metformin regularly.

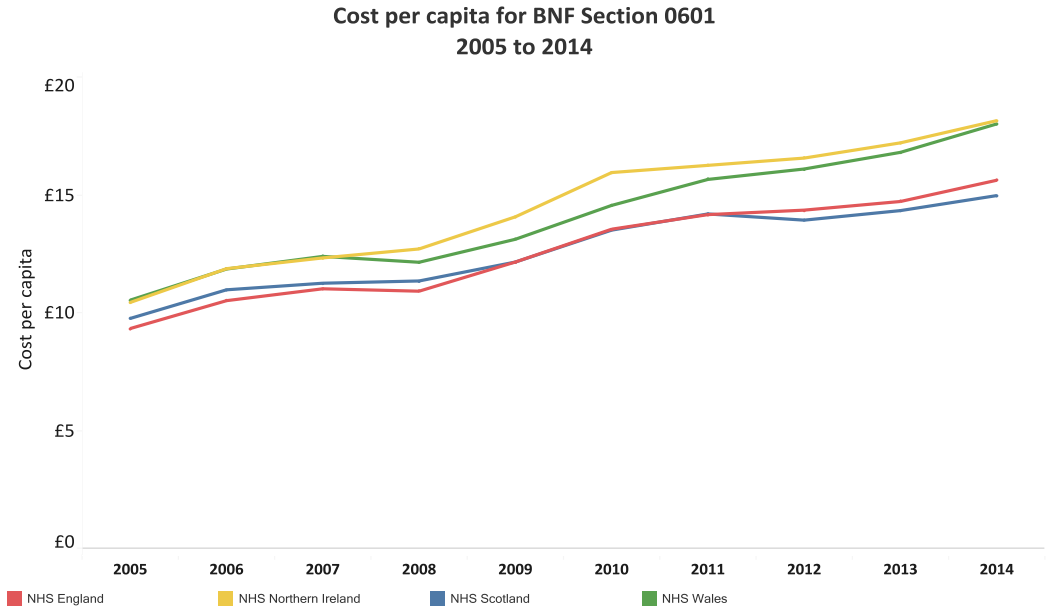
One of the oral antidiabetic drugs was able to be stopped, therefore decreasing the tablet burden for this patient.

By running a specific type 2 diabetes clinic, the pharmacist was able to focus entirely on patients with type 2 diabetes and dedicate time to chasing up patients who do not attend, using a variety of contact methods. Clinic attendance rate is generally very good.

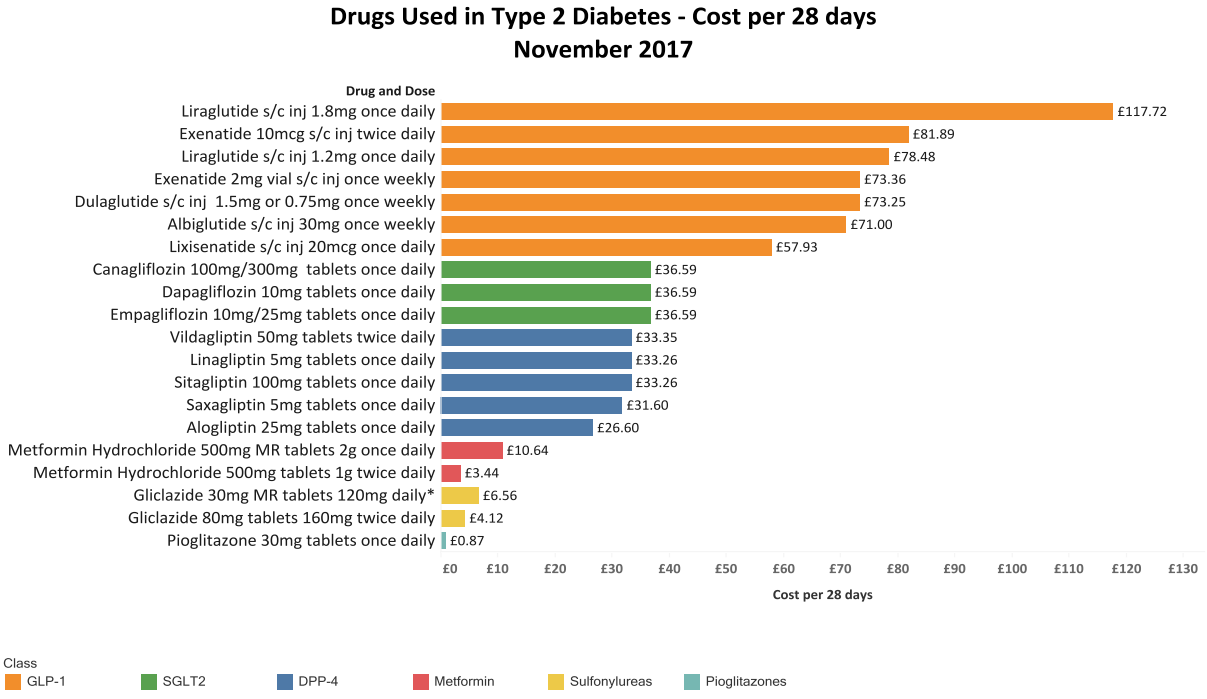
The pharmacist working in the GP clinic has been able to develop working relationships with both Specialist Nurses and Diabetes Consultants which has assisted in improving the management of patients.

# Guidance for Boards

NHS Scotland spends less per capita on prescribing for type 2 diabetes (BNF Chapter 6.1) than the rest of the United Kingdom, as the chart below demonstrates.




Diabetes medicines experience dynamic changes in pricing. Therefore, to ensure high quality, cost effective prescribing there is a need for regular review of preferred products within formularies taking into consideration the latest clinical evidence and pricing.[17]




* Only branded generics were listed for gliclazide 30mg MR with cost of the cheapest being used for this chart (Vamju 30mg MR tabs).

[17] Chart uses data from C&D

**Comparative data**

A *National Therapeutic Indicator* (NTI) allows Boards to measure the use of metformin as a proportion of all oral anti diabetic drugs. Review of prescribing should focus on those patients prescribed antidiabetic medication without metformin. This is especially important for patients prescribed second or third line agents before metformin.

Response to treatment should be assessed, and SIGN 116 advises that **a reduction in $HbA_{1c}$ of 0.5% (5.5 mmol/mol) is expected and if this is not achieved after 3-6 months or maintained thereafter, consideration should be given to trial without therapy to determine if substitution or add on therapy is appropriate.**

Within the data, the boxplot charts should be interpreted as follows:

- Median GP practices in NHS Board– dark grey bar
- Interquartile range or middle 50% of GP practices in NHS Board – blue box
- Maximum and minimum – whiskers, unless greater than 1.5 of interquartile range
- Outliers – (○) GP practice value greater than 1.5 but less than 3.0 of interquartile range
- Extreme outliers – (•) GP practice value greater than 3.0 of interquartile range

The three year charts utilise the mean position of the Board, each year.

Pricing data was taken from the Scottish Drug Tariff and Chemist & Druggist. **Note – all pricing data is subject to change.**

The data provided must be considered within the context of local populations and local healthcare arrangements, and provides an indicator of clinical practice. Due to the complex nature of the prescribing being analysed it is not possible to provide advice on *what good looks like*.

## Antidiabetic Drugs

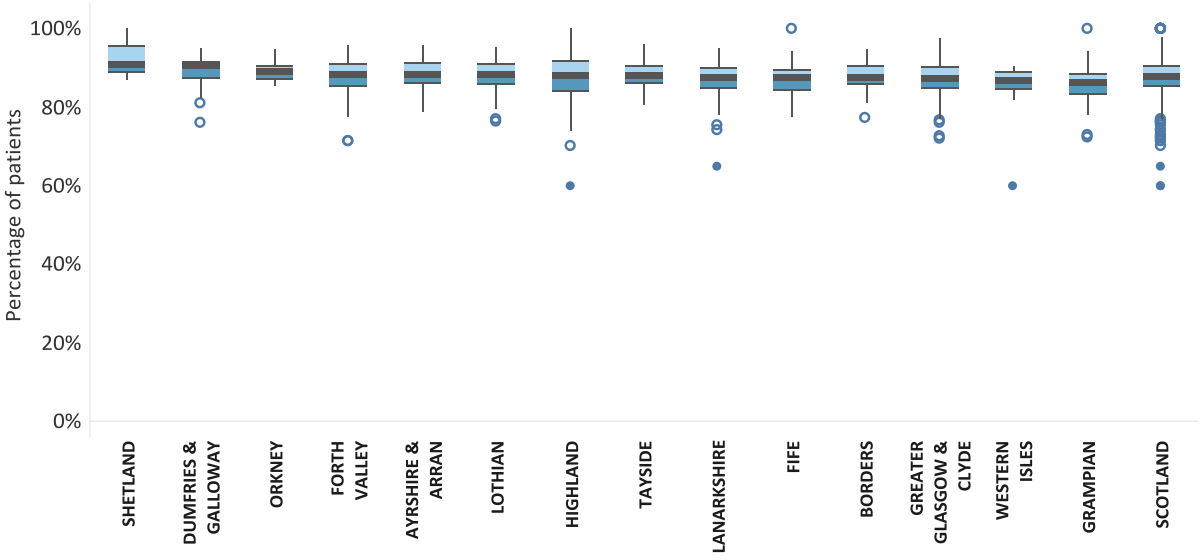
The therapeutic use of antidiabetic drugs must be supported by the consumption of a healthy diet for people with diabetes and appropriate physical activity. In addition, the greater importance of lipid lowering and blood pressure control, when required, should be recognised.

SIGN 116 & 154 provides guidance on $HbA_{1c}$ targets that should be set for patients. When dealing with frail patients also consider polypharmacy advice.

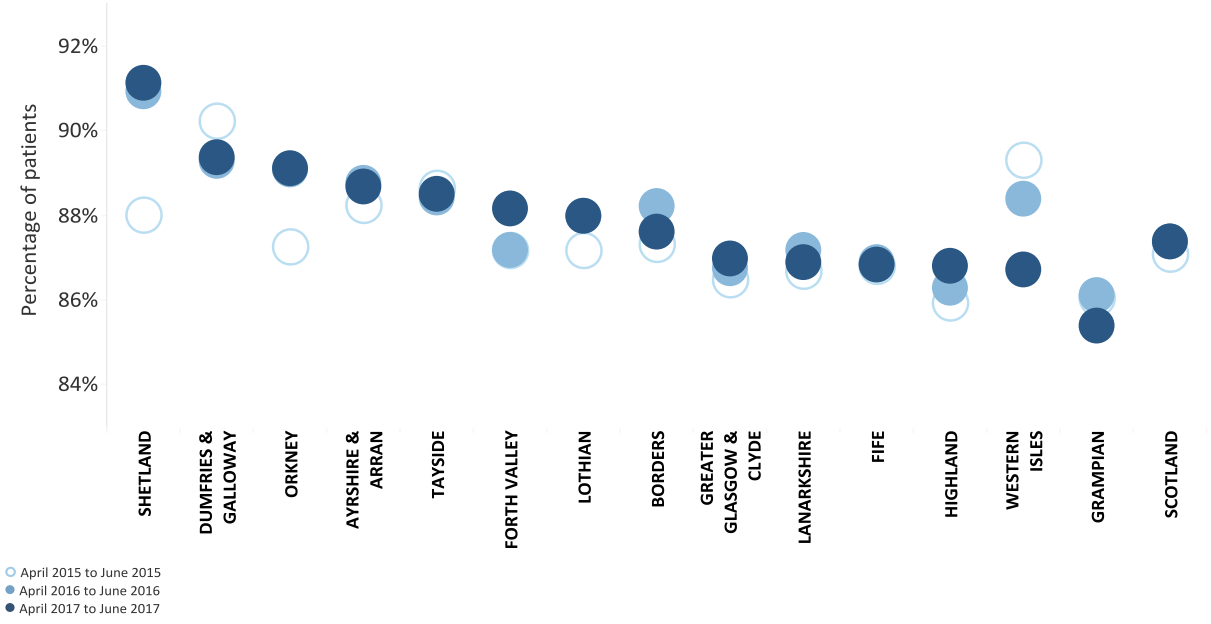
Combination products are increasingly used to decrease tablet load and may be more cost effective. This can be used once the patient tolerates the medicine and is stabilised. Use should be considered at ongoing reviews.

## Metformin

**Number of patients prescribed Metformin as a percentage of all patients prescribed a drug from BNF Sub Section 060102 (Antidiabetic Drugs)**
**April 2017 to June 2017**




**Number of patients prescribed Metformin as a percentage of all patients prescribed a drug from BNF Sub Section 060102 (Antidiabetic Drugs)**
**April to June of 2015 to 2017**



**Metformin** should be the first-line agent due to its proven evidence of survival advantage. Boards have continued to demonstrate good practice in use of metformin, as demonstrated by the charts above.

| **Key information** | **Metformin** |
|---|---|
| Efficacy | Moderate |
| CV benefit | Yes |
| Hypoglycaemia risk | Low |
| Weight | Reduction |
| Main adverse events | Gastrointestinal |
| In CKD stage 3A (eGFR 45-59) | Maximum 2 grams per day |
| Cost for 28 days treatment | £3.44 - £10.64 |

**Case Study – NHS Lothian**

**Key Learning**

Discussion of side effects and potential medication issues.

**The Components**

A female patient aged 60 has had type 2 diabetes for 5 years. She recently registered with a new GP practice and was having her first diabetes review appointment. All of her investigations were satisfactory with her $HbA_{1c}$ at 54 mmol/mol. The GP discussed exercise and lifestyle as part of the consultation. The lady wanted to do more exercise and set a goal of 20 minutes walking on 5 days each week with an aim to also lose 2 kg before her next review appointment. The GP asked the patient if she had any further questions to which the lady responded:

*"Do you have appointments later in the morning? You see I find I need to be near a toilet after taking the metformin".*

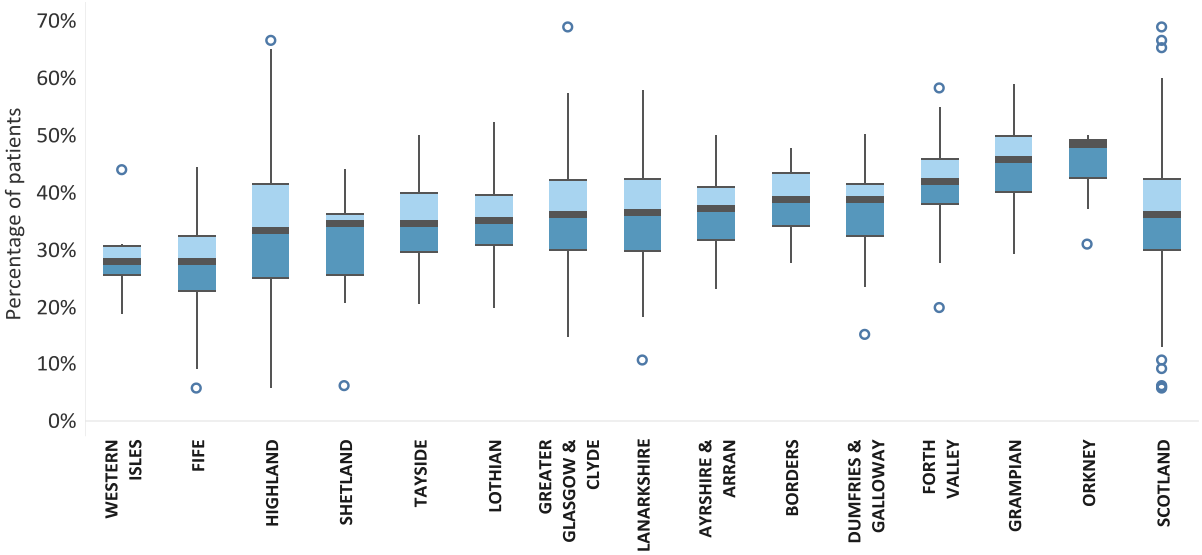
The key issue for the patient was a side effect from the medication. The GP made a change in metformin formulation to the modified release preparation. Although the cost of the medicine is more than the standard release product, it is significantly less expensive than second line agents.

**The Benefits**

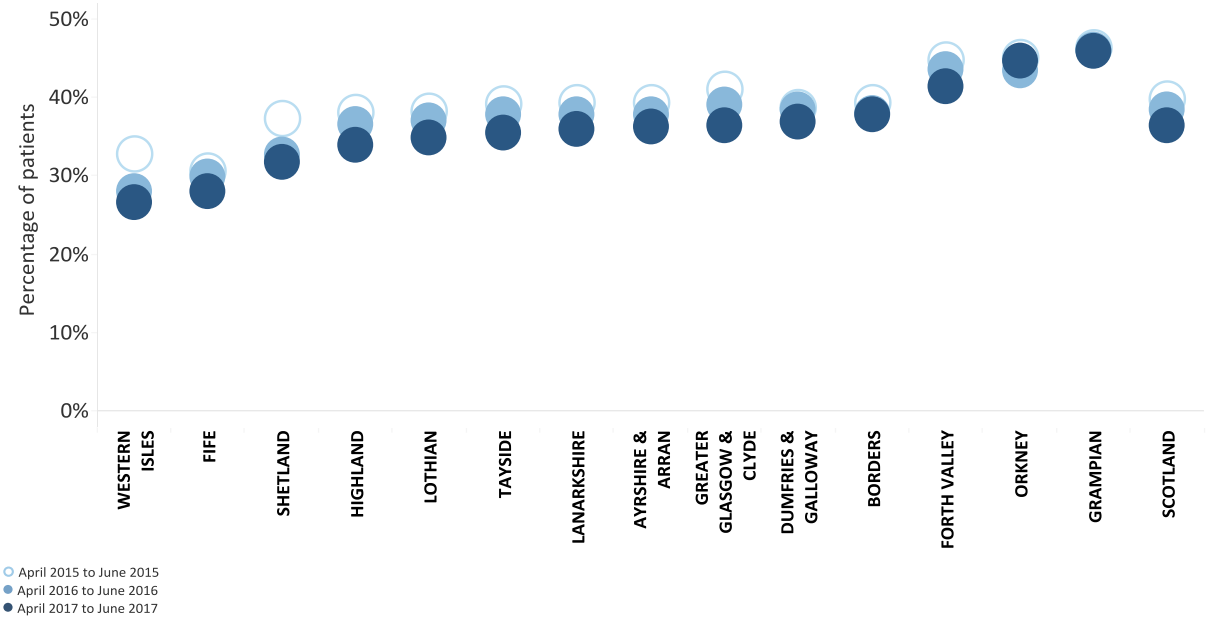
Patients will often put up with significant side effects due to the medication they are taking. This may affect compliance. Encouraging discussion of potential side effects can facilitate discussion of other options. With metformin, the likelihood of side effects may be reduced by starting with a low dose which is slowly increased.

## Sulfonylureas

**Number of patients prescribed Sulfonylureas as a percentage of all patients prescribed a drug from BNF Sub Section 060102 (Antidiabetic Drugs)**
**April 2017 to June 2017**

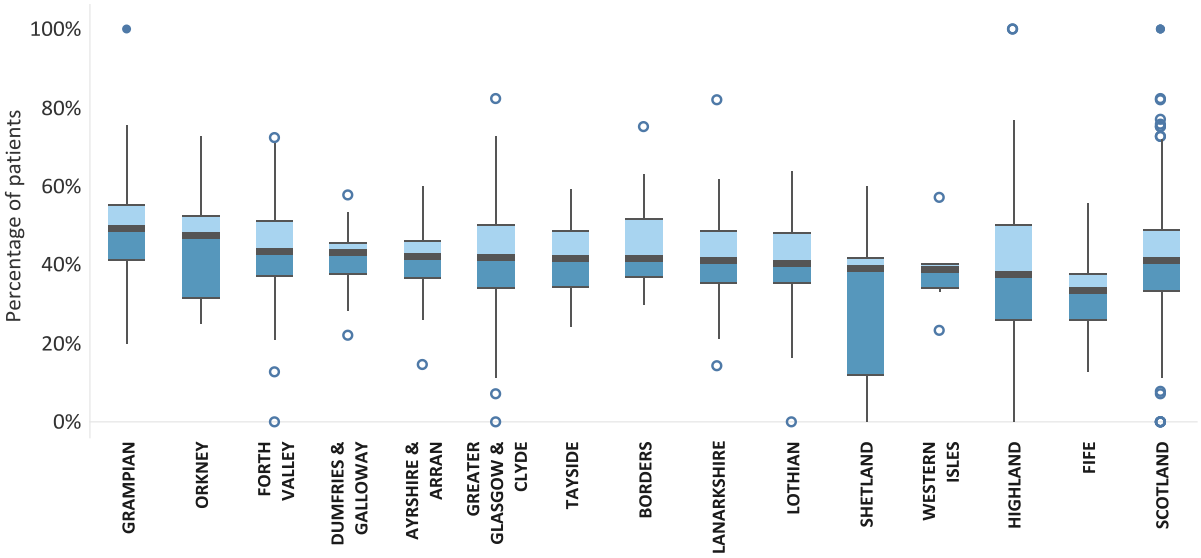



**Number of patients prescribed Sulfonylureas as a percentage of all patients prescribed a drug from BNF Sub Section 060102 (Antidiabetic Drugs)**
**April to June of 2015 to 2017**

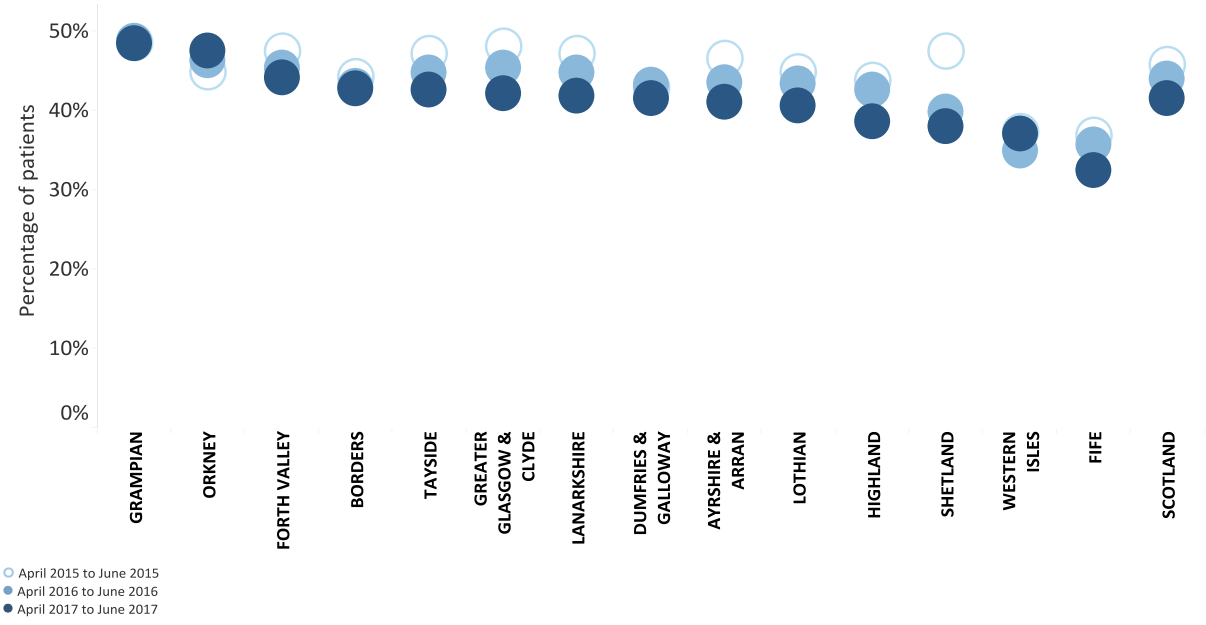


## Sulfonylureas in patients aged over 75

**Number of patients over 75 prescribed Sulfonylureas as a percentage of all patients over 75 prescribed a drug from BNF Sub Section 060102 (Antidiabetic Drugs)**
**April 2017 to June 2017**




**Number of patients over 75 prescribed Sulfonylureas as a percentage of all patients over 75 prescribed a drug from BNF Sub Section 060102 (Antidiabetic Drugs)**
**April to June of 2015 to 2017**



**Sulfonylureas** are recognised by SIGN 154 as a first-line agent for those who are intolerant of, or have contra-indications to, metformin, or second line agents in other patients. Its use may be associated with weight gain and increased risk of hypoglycaemic episodes.

| **Key information** | **Sulfonylureas** |
|---|---|
| Efficacy | High |
| CV benefit | No |
| Hypoglycaemia risk | High |
| Weight | Gain |
| Main adverse events | Hypoglycaemia |
| In CKD stage 3A (eGFR 45-59) | Careful monitoring (consider dose reduction) |
| Cost for 28 days treatment | £4.12 - £6.56 |

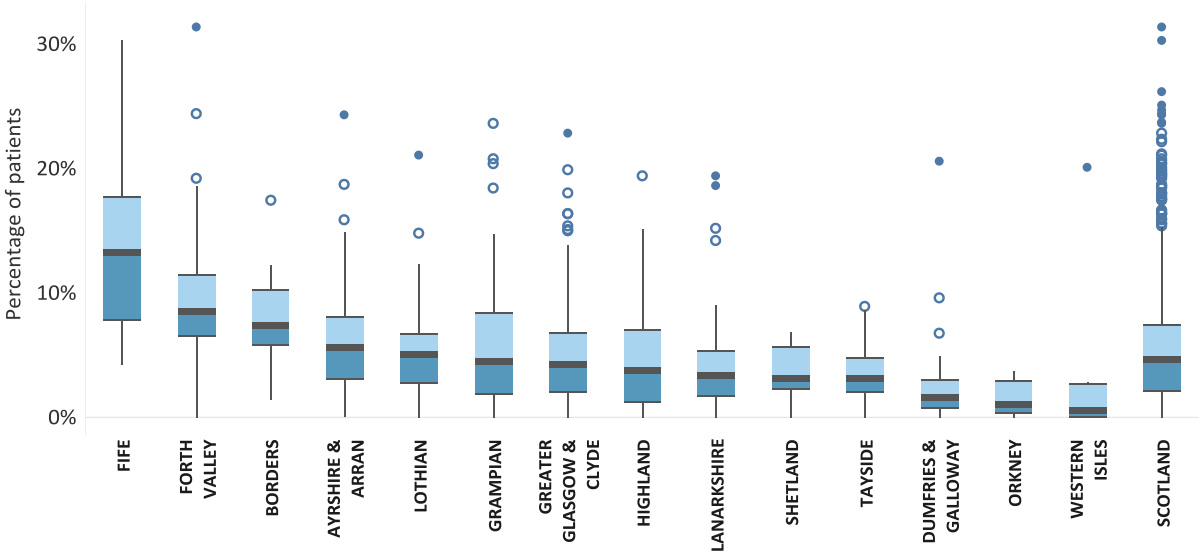
**Sulfonylureas in frail patients** are recognised as a potential risk. While the charts on the previous page show patients over 75 years old, the key issues are of frailty, weight loss, renal function and cognitive decline, which increase the risk of side effects.

One of the key considerations when treating type 2 diabetes in frail patients needs to be the avoidance of hypoglycaemia. Hypoglycaemic episodes can exacerbate dementia and confusion and can increase the likelihood of falls and cardiac arrhythmias. This can lead to emergency hospital admissions. Sick Day Rule guidance should be communicated to patients. Refer to Polypharmacy Guidance.

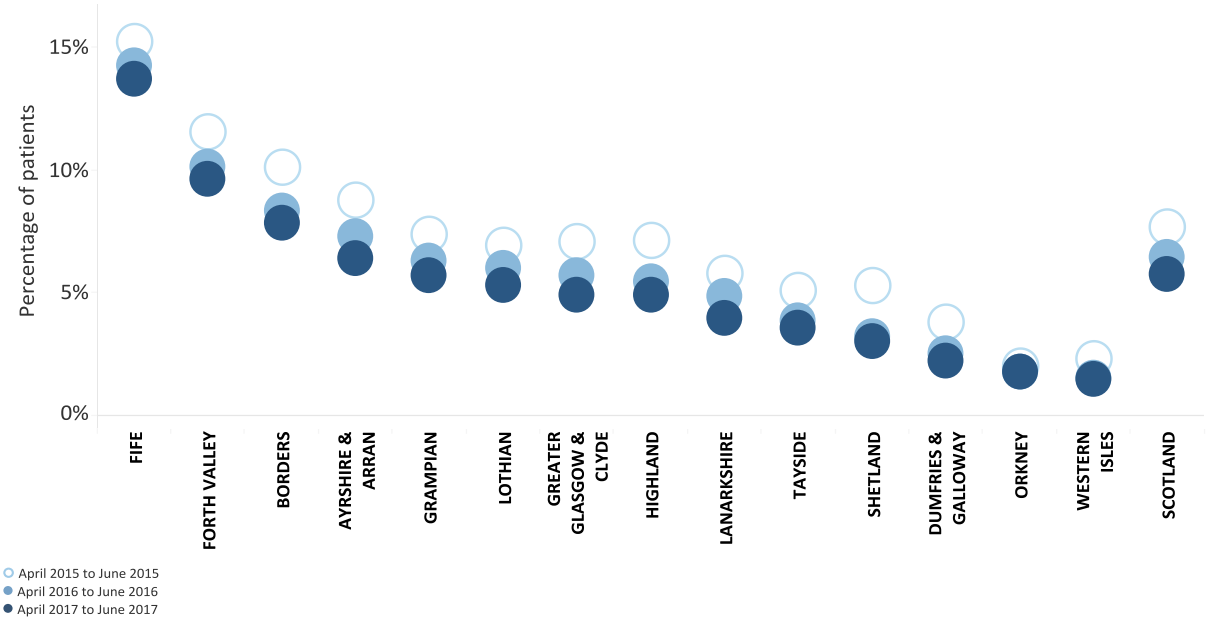
Boards should use local expertise and data to develop appropriate targeting of reviews.

## Pioglitazone

**Number of patients prescribed Pioglitazone as a percentage of all patients prescribed a drug from BNF Sub Section 060102 (Antidiabetic Drugs)**
**April 2017 to June 2017**




**Number of patients prescribed Pioglitazone as a percentage of all patients prescribed a drug from BNF Sub Section 060102 (Antidiabetic Drugs)**
**April to June of 2015 to 2017**



Pioglitazone is an alternative second or third-line agent, but use is associated with weight gain. The European Medicines Agency has previously advised of a small increased risk of bladder cancer associated with pioglitazone use. However a large pooled multi-population analysis was published in 2014, concluding that the cumulative use of pioglitazone was not associated with the incidence of bladder cancer.[18]

Pioglitazone should **not** be used in patients with heart failure. Pioglitazone is associated with an increased risk of bone fractures, particularly in women. These are predominantly distal limb fractures and often do not occur until after at least a year of treatment. Although the absolute fracture risk is low, the risk is doubled by the use of pioglitazone which equates to an excess fracture rate of 0.5-1 fractures/100 patient years. The increased risk of hip fracture should also be considered during long term treatment. In light of age related risks (especially bladder cancer, fractures and heart failure), the balance of benefits and risks should be considered carefully both before and during treatment in the elderly.[19] MHRA recommends that liver enzymes should be checked prior to initiation of pioglitazone – therapy should not be initiated in patients with elevated baseline liver enzyme levels or with any other evidence of liver disease. Periodic monitoring is also recommended, based on clinical judgement.

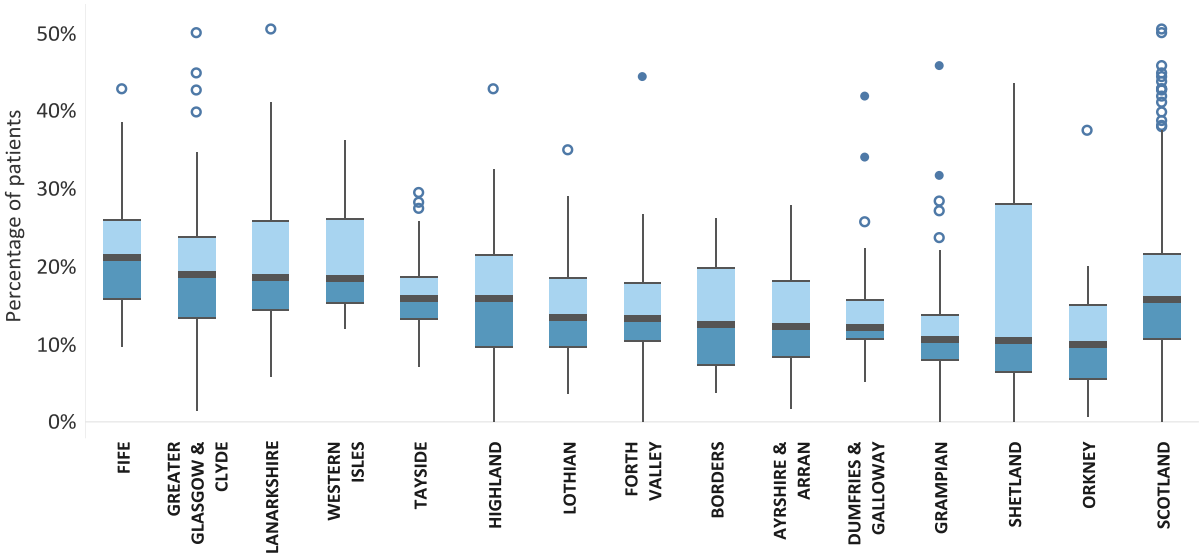
| **Key information** | **Pioglitazone** |
|---|---|
| Efficacy | Moderate |
| CV benefit | Probable (but fluid retention) |
| Hypoglycaemia risk | Low |
| Weight | Gain |
| Main adverse events | Oedema/Fractures/Bladder Cancer |
| In CKD stage 3A (eGFR 45-59) | Dose unchanged |
| Cost for 28 days treatment | £0.87 |

Bisphosphonates are widely used to treat and prevent bone-related conditions. Given the increased fracture risk with pioglitazone, this combination of prescribing a bisphosphonate and a pioglitazone should be reviewed.

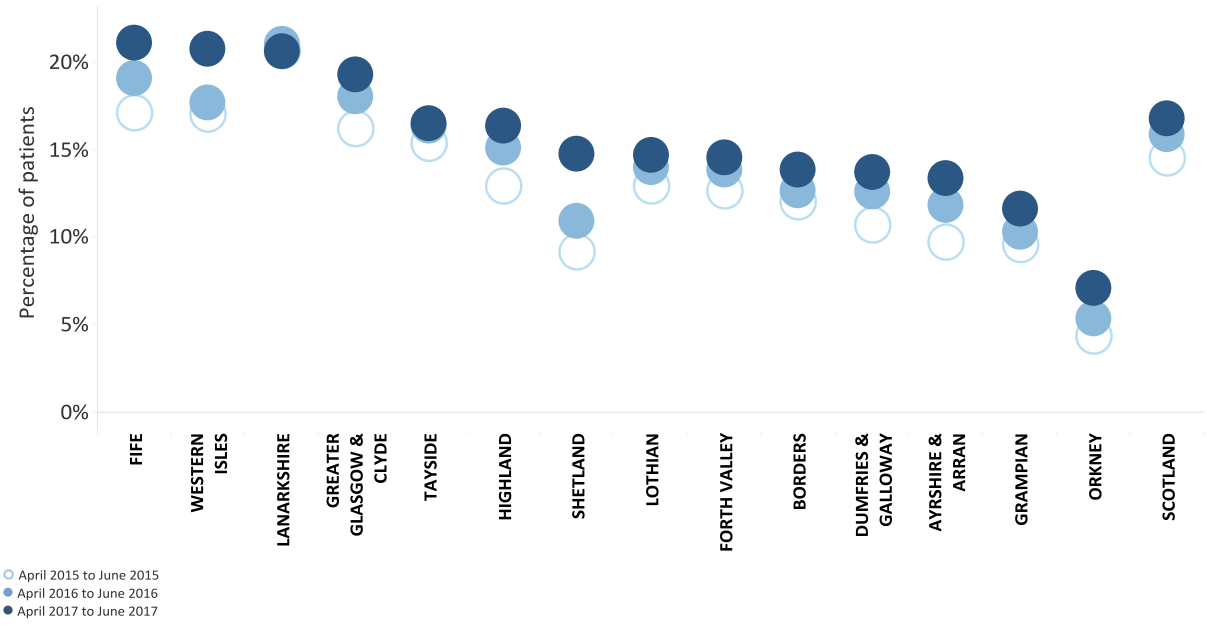
[18] Helen M. Colhoun et al. Pioglitazone and bladder cancer risk: a multipopulation pooled, cumulative exposure analysis. Diabetologia, December 2014 DOI: 10.1007/s00125-014-3456-9
[19] MHRA – Decentralised Procedure - Pioglitazone

## Dipeptidyl peptidase-4 (DPP-4) inhibitors

**Number of patients prescribed DPP-4 Inhibitors as a percentage of all patients prescribed a drug from BNF Sub Section 060102 (Antidiabetic Drugs)**
**April 2017 to June 2017**




**Number of patients prescribed DPP-4 Inhibitors as a percentage of all patients prescribed a drug from BNF Sub Section 060102 (Antidiabetic Drugs)**
**April to June of 2015 to 2017**



**DPP-4 inhibitors** are alternative second or third-line agents. They have a neutral effect on weight and no increased risk of hypoglycaemia.

| **Key information** | **DPP-4s** |
|---|---|
| Efficacy | Low/moderate |
| CV benefit | No |
| Hypoglycaemia risk | Low |
| Weight | Neutral |
| Main adverse events | Few |
| In CKD stage 3A (eGFR 45-59) | Reduce dose (see BNF, no dose reduction for linagliptin) |
| Cost for 28 days treatment | £26.20 – £33.35 |

DPP-4 agents have different licensed indications and licensed drugs where available should be used. Although DPP-4 inhibitors have few adverse events associated with their use, in 2012 the MHRA gathered reports of acute pancreatitis and issued the following advice.

*Patients treated with DDP-4 inhibitors should be informed of the characteristic symptoms of acute pancreatitis – persistent, severe abdominal pain (sometimes radiating to the back) – and encouraged to tell their healthcare provider if they have such symptoms. If pancreatitis is suspected, the DPP-4 inhibitor and other potentially suspect medicines should be stopped.*

The case study below, from NHS Lanarkshire, highlights the improvement made by the Board through clinical review and medicines optimisation around DPP-4 inhibitors.

**Case Study – NHS Lanarkshire**

**Key Learning**
Formulary compliance in DPP-4 inhibitor medicines and stopping inappropriate therapy.

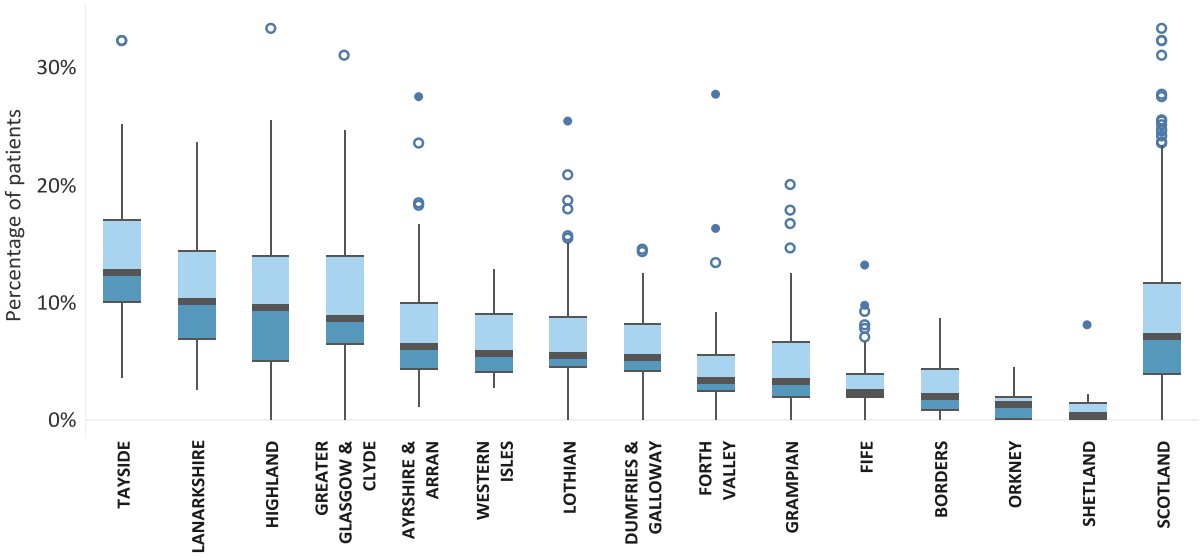
**The Components**
The use of DPP-4 inhibitors was presented at a local Diabetes MCN Education event. This started collaborative work to review the DPP-4 inhibitor selection on the local formulary and associated algorithm for treatment of type 2 diabetes. NHS Lanarkshire wanted to review existing prescribing, highlighting where DPP-4 inhibitors were being used inappropriately. This involved both stopping therapy where it wasn't demonstrating clinical efficacy and switching to formulary choices.

A comprehensive prescribing review guideline was developed with a protocol for reviews, searches, and patient letters. This review was initially delivered by pharmacists in the Prescribing Team, and during 2016/7, by GPs and nurses as part of a Prescribing Incentive Scheme. A full copy of the review protocol and associated materials is available from the NHS Lanarkshire Prescribing Team prescribing@lanarkshire.scot.nhs.uk

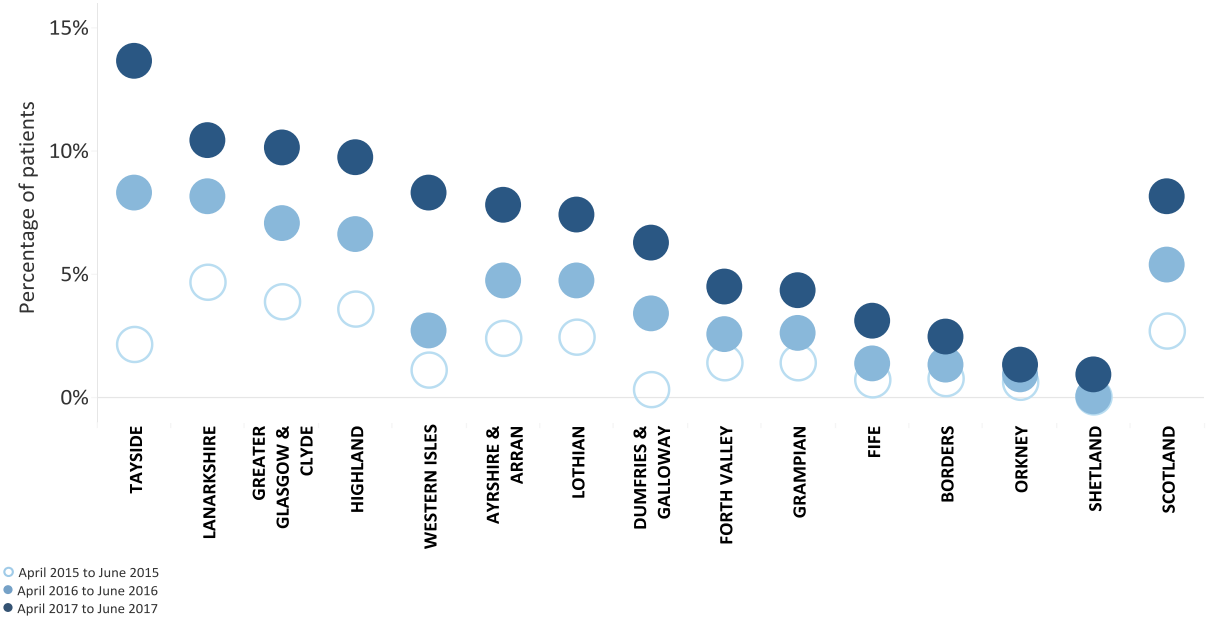
**The Benefits**
Through clinical review and optimisation of therapy, the use of formulary agents has increased and rising costs have been contained.

## Sodium-glucose co-transporter 2 (SGLT2) inhibitors

**Number of patients prescribed SGLT2 Inhibitors as a percentage of all patients prescribed a drug from BNF Sub Section 060102 (Antidiabetic Drugs)**
**April 2017 to June 2017**




**Number of patients prescribed SGLT2 Inhibitors as a percentage of all patients prescribed a drug from BNF Sub Section 060102 (Antidiabetic Drugs)**
**April to June of 2015 to 2017**



**SGLT-2 inhibitors** are alternative second or third-line agents. They should be considered when hypoglycaemia is a concern or weight loss is considered to be beneficial. Their use is associated with increased risk of genital and urinary tract infections.

Two recent trials (EMPA-REG* and CANVAS[#]) looked at individuals with type 2 diabetes and high cardiovascular risk. SGLT-2 inhibitors (empagliflozin* and canaglaflozin[#]) showed cardiovascular benefit.[20]

For individuals with type 2 diabetes and established cardiovascular disease, SGLT-2 inhibitors with proven cardiovascular benefit (currently empagliflozin and canagliflozin) should be considered.

| **Key information** | **SGLT-2 Inhibitors** |
|---|---|
| Efficacy | Moderate |
| CV benefit | Yes (specific agents) |
| Hypoglycaemia risk | Low |
| Weight | Loss |
| Main adverse events | Genital mycotic |
| In CKD stage 3A (eGFR 45-59) | Do not initiate (see BNF, specific agents can be continued at reduced dose) |
| Cost for 28 days treatment | £36.59 |

The SGLT-2 inhibitors are the newest class of medicines for type 2 diabetes and Boards should ensure prescribers are aware of current safety information. In April 2016 the MHRA[21] updated advice on the risk of diabetic ketoacidosis (DKA) with SGLT-2 inhibitors.

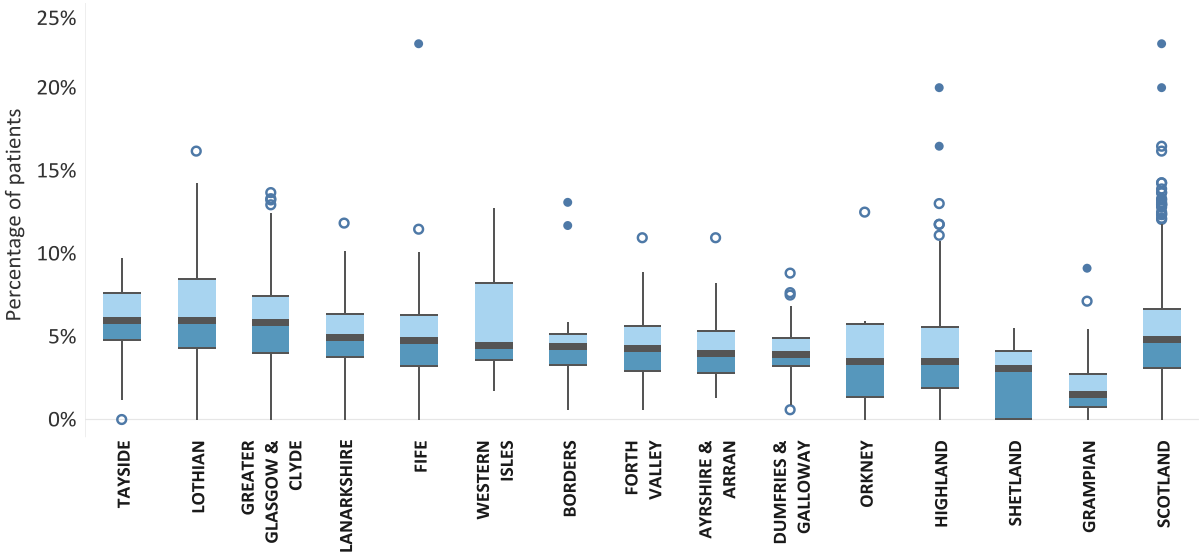
MHRA advise that SGLT-2 inhibitors should be used with caution in patients at risk of DKA, particularly those with low endogenous insulin secretion, increased insulin requirement (due to illness, surgery or alcohol abuse) or conditions that result in reduced oral intake or severe dehydration. SGLT-2 inhibitors should be stopped temporarily if undergoing major surgery or during serious illness.

MHRA also advise that canaglaflozin may increase the risk of lower limb amputation (mainly toes) in patients with type 2 diabetes. Evidence does not show an increased risk for dapagliflozin and empaglaflozin, but the risk may be a class effect. This warning has been added to the Summary of Product Characteristics for all SGLT-2 inhibitors. Preventative foot care is important for all patients with diabetes.

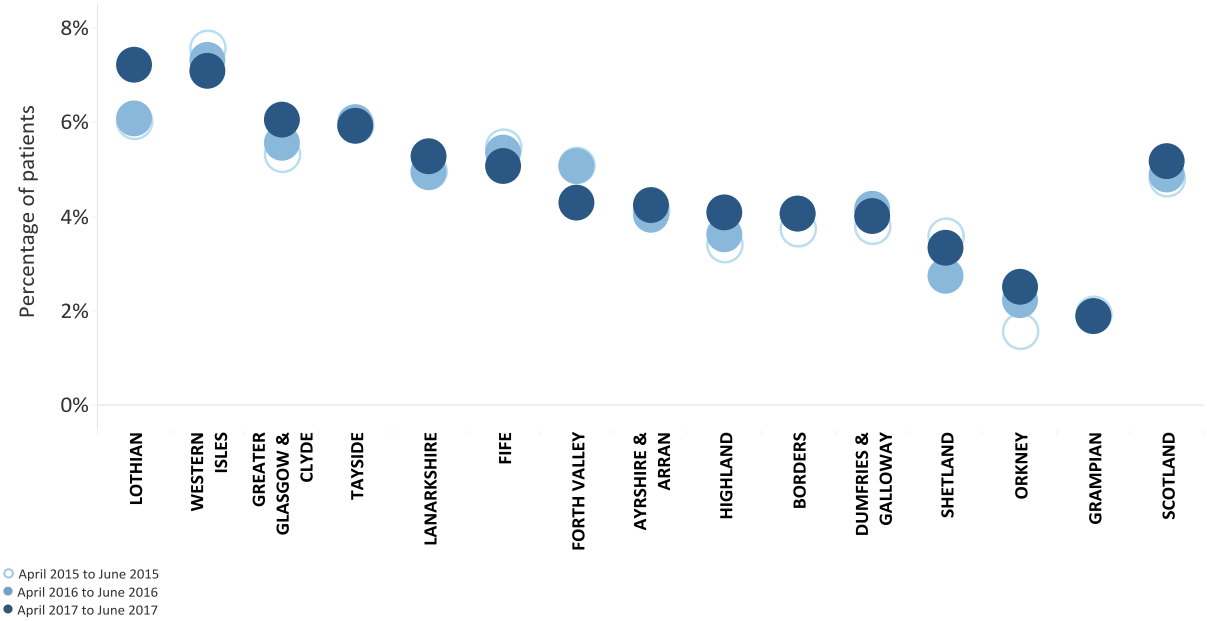
[20] SIGN 154 – Pharmacological Management of glycaemic control in people with type 2 diabetes
[21] https://www.gov.uk/drug-safety-update/sglt2-inhibitors-updated-advice-on-the-risk-of-diabetic-ketoacidosis

## Glucagon like Peptide-1 (GLP-1) agonists

**Number of patients prescribed GLP-1 Agonists as a percentage of all patients prescribed a drug from BNF Sub Section 060102 (Antidiabetic Drugs)**
**April 2017 to June 2017**




**Number of patients prescribed GLP-1 Agonists as a percentage of all patients prescribed a drug from BNF Sub Section 060102 (Antidiabetic Drugs)**
**April to June of 2015 to 2017**



**GLP-1 agonists** are alternative third-line antidiabetic agents that are injectable. They may help weight-loss and are not associated with increased risk of hypoglycaemia. For individuals with type 2 diabetes and established cardiovascular disease, GLP-1 agonist therapies with proven cardiovascular benefit (currently only liraglutide) should be considered. GLP-1 agonist therapy should be considered as an alternative to treatment with insulin in people for whom treatment with combinations of oral agents has been inadequate. The recent LEADER study, randomised and large scale, on liraglutide demonstrated cardiovascular benefit to those at high cardiovascular risk.[22] The MHRA highlighted in 2009 the risks of severe pancreatitis and renal failure with exenatide.

| Key information | GLP-1 agonists |
|---|---|
| Efficacy | High |
| CV benefit | Yes (liraglutide) |
| Hypoglycaemia risk | Low |
| Weight | Loss |
| Main adverse events | Gastrointestinal |
| In CKD stage 3A (eGFR 45-59) | Dose unchanged (caution with exenatide when eGFR < 50ml/min/1.73)$m^2$) |
| Cost | £57.93 - £117.72 |

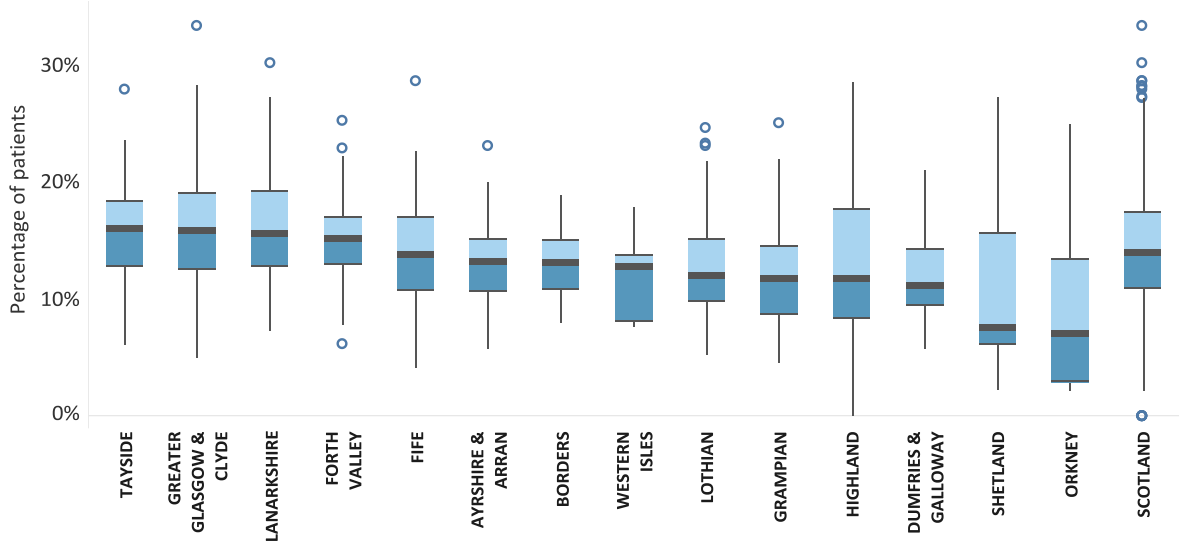
There are no guidelines that support the combined use of a GLP-1 agonist and a DPP-4 inhibitor. Without any studies demonstrating clear benefits of this combination, it is not currently recommended. If a GLP-1 agonist is indicated then any current treatment with a DPP-4 should be stopped. To give an indication of how often this combination is prescribed the table below shows a breakdown of the number of patients prescribed a GLP-1 and a DPP-4, by Board.

| Number of patients prescribed both a GLP-1 Analogue and a DPP-4 Inhibitor April 2017 to June 2017 | |
|---|---|
| **NHS Board** | **Patient Count** |
| NHS AYRSHIRE & ARRAN | 27 |
| NHS BORDERS | 4 |
| NHS DUMFRIES & GALLOWAY | 9 |
| NHS FIFE | 30 |
| NHS FORTH VALLEY | 15 |
| NHS GRAMPIAN | 13 |
| NHS GREATER GLASGOW & CLYDE | 140 |
| NHS HIGHLAND | 22 |
| NHS LANARKSHIRE | 61 |
| NHS LOTHIAN | 87 |
| NHS ORKNEY | 1 |
| NHS SHETLAND | 0 |
| NHS TAYSIDE | 23 |
| NHS WESTERN ISLES | 9 |
| NHS SCOTLAND | 441 |

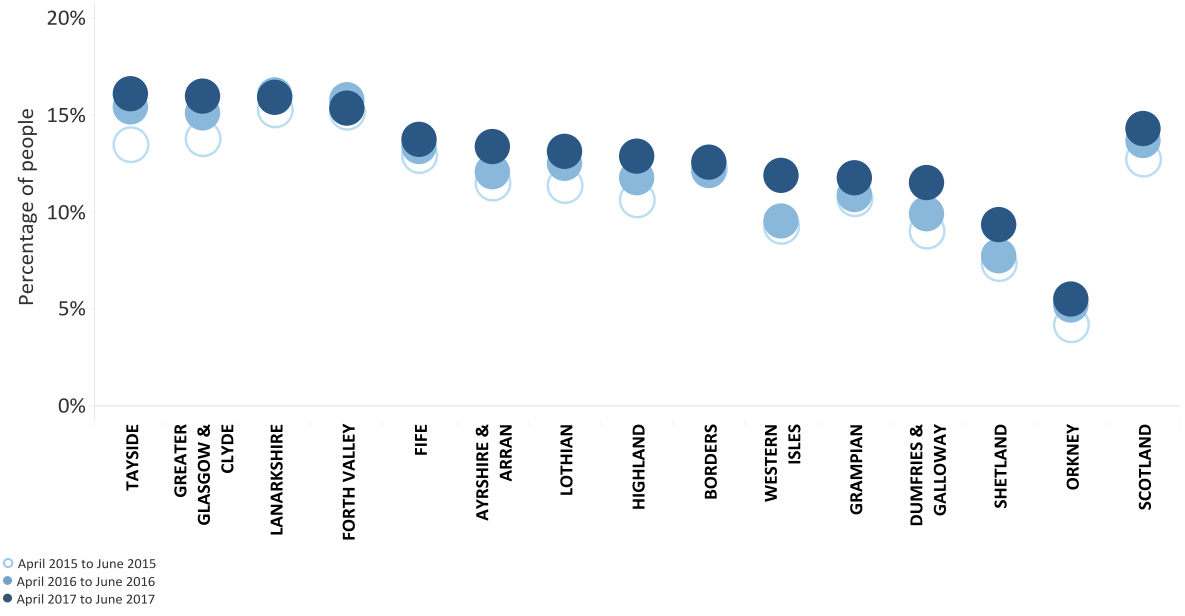
[22] SIGN 154

## Polypharmacy in Diabetes

**Number of patients prescribed Antidiabetic Drugs from three or more categories as a percentage of all patients prescribed an Antidiabetic Drug (BNF Sub Section 060102)**
**April 2017 to June 2017**

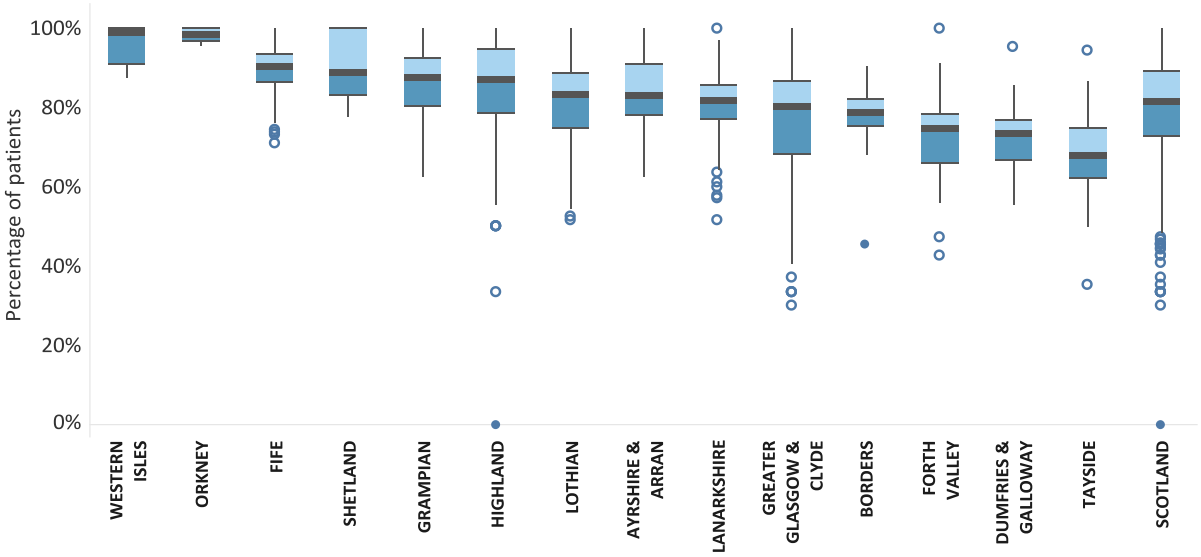



**Number of patients prescribed Antidiabetic Drugs from three or more categories as a percentage of all patients prescribed an Antidiabetic Drug (BNF Sub Section 060102)**
**April to June of 2015 to 2017**

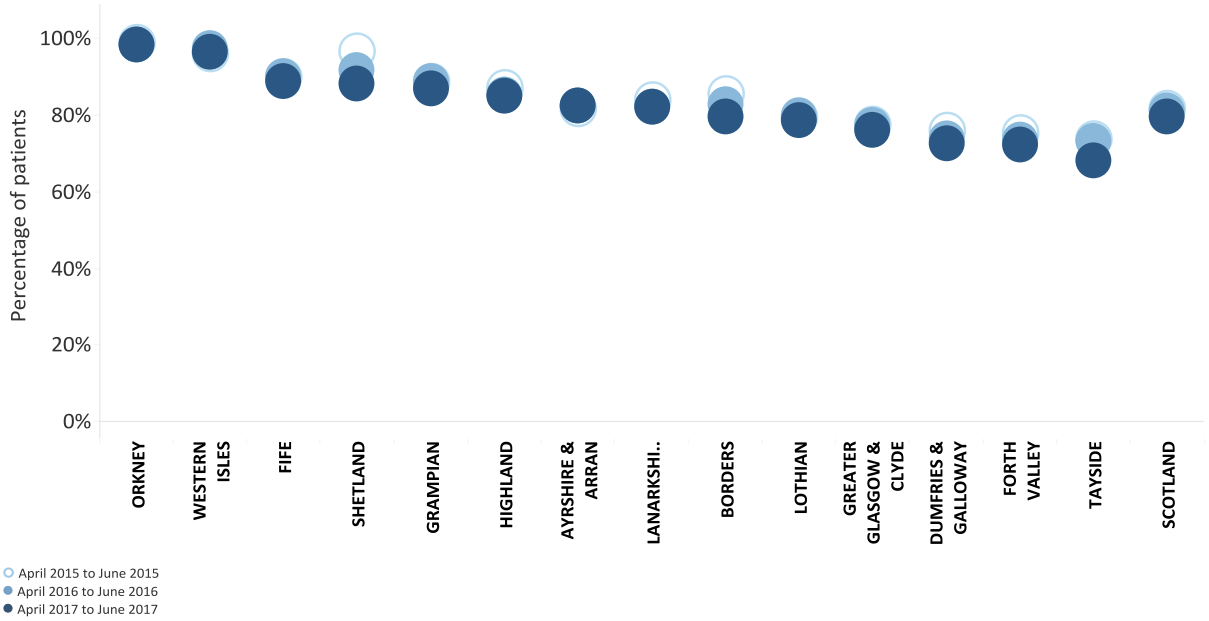


## Insulins

**Number of patients prescribed Long Acting Insulin Analogues (Detemir and Glargine) as a percentage of all Intermediate and Long Acting Insulins (excluding Biphasic Insulins) April 2017 to June 2017**




**Number of patients prescribed Long Acting Insulin Analogues (Detemir and Glargine) as a percentage of all Intermediate and Long Acting Insulins (excluding Biphasic Insulins) April to June of 2015 to 2017**




*these figures related to all prescribing – not specific to patients with type 2 diabetes

Type 2 diabetes can progress and require a third-line agent for glycaemic control. For most non-obese patients, insulins remain the preferred third-line therapy following optimal use of first and second-line agents. Oral metformin therapy should be continued when insulin therapy is initiated to maintain or improve glycaemic control. SIGN advises that when commencing insulin therapy, **human intermediate acting insulins should be initiated** in the first instance. Insulin analogues may be considered according to hypoglycaemic risk.

Analogue insulins are biological medicines which should be prescribed and dispensed by brand name. Where a clinical decision is made that an analogue insulin is appropriate for a patient with type 2 diabetes then it should therefore be prescribed by brand name. There are now biosimilar preparations available for insulin glargine and it is therefore important that the patient receives the product intended by the prescriber.

| **Key information** | **Basal Insulin** |
|---|---|
| Efficacy | High |
| CV benefit | No |
| Hypoglycaemia risk | Highest |
| Weight | Gain |
| Main adverse events | Hypoglycaemia |
| In CKD stage 3A (eGFR 45-59) | Dose unchanged |
| Cost | Variable |

The data below has been extracted from the SCI-DC system in September 2017. It details the use of analogue insulins in patients with type 2 diabetes, by Board.

| **Board** | **No. of people with type 2 diabetes on ANY long or intermediate insulin** | **No. and (%)people with type 2 diabetes on a long or intermediate ANALOGUE insulin** |
|---|---|---|
| Ayrshire and Arran | 2,644 | 801 (30%) |
| Borders | 871 | 312 (36%) |
| Dumfries and Galloway | 1,032 | 283 (27%) |
| Fife | 2,624 | 949 (36%) |
| Forth Valley | 1,670 | 572 (34%) |
| Grampian | 2,588 | 1005 (39%) |
| Greater Glasgow & Clyde | 5,945 | 1625 (27%) |
| Highland | 2,146 | 966 (45%) |
| Lanarkshire | 3,736 | 1505 (40%) |
| Lothian | 5,147 | 1727 (34%) |
| Orkney | 180 | 158 (88%) |
| Shetland | 159 | 81 (51%) |
| Tayside | 2,940 | 803 (27%) |
| Western Isles | 217 | 147 (68%) |
| **Scotland** | **31,899** | **10,934 (34%)** |

The case study below from NHS Grampian illustrates the potential to improve local prescribing levels of human insulin.

**Case Study – NHS Grampian**

**Key learning**
Promoting use of human insulin over analogue insulin.

**The Components**
The Grampian Guidelines for Diabetes Management and the local formulary highlight using the right insulin for the right patients.

The Diabetes Managed Clinical Network (MCN) in Grampian holds a well-attended annual conference for both primary and secondary care clinicians. During the conference insulin therapy for patients with type 2 diabetes is discussed and the MCN used this as an opportunity to encourage use of human insulin in people with type 2 diabetes.

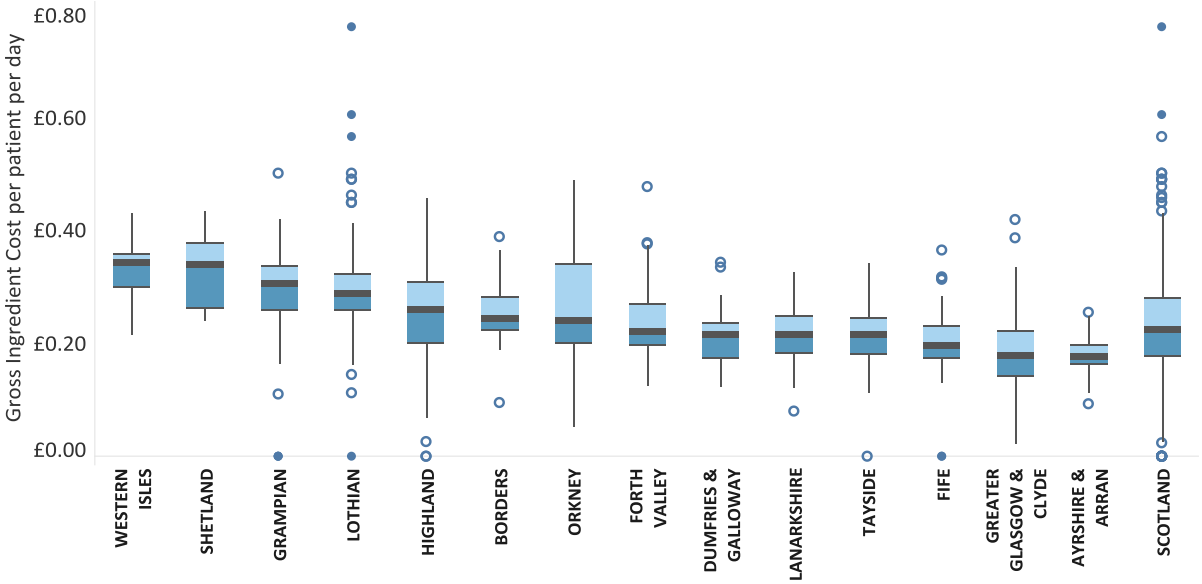
A multidisciplinary Diabetes Team (MDT) including a nurse, doctor and dietician run a training day regularly for Primary Care Diabetes teams on the use of insulin in type 2 diabetes. This training again highlights the appropriate use of human insulin.

Each GP practice has a link consultant Diabetologist. Many undertake visits 2-3 times per year to the practice to talk to the GPs and nurses accompanied by a Diabetes MDT. This can involve discussion on individual patients and creates a real time education opportunity with real patient cases. Each visit is tailored to the needs of the practice and can range from discussion on insulin choices to the dietician providing education on lifestyle advice. This collaborative working also helps to reduce the number of referrals to secondary care diabetes services.

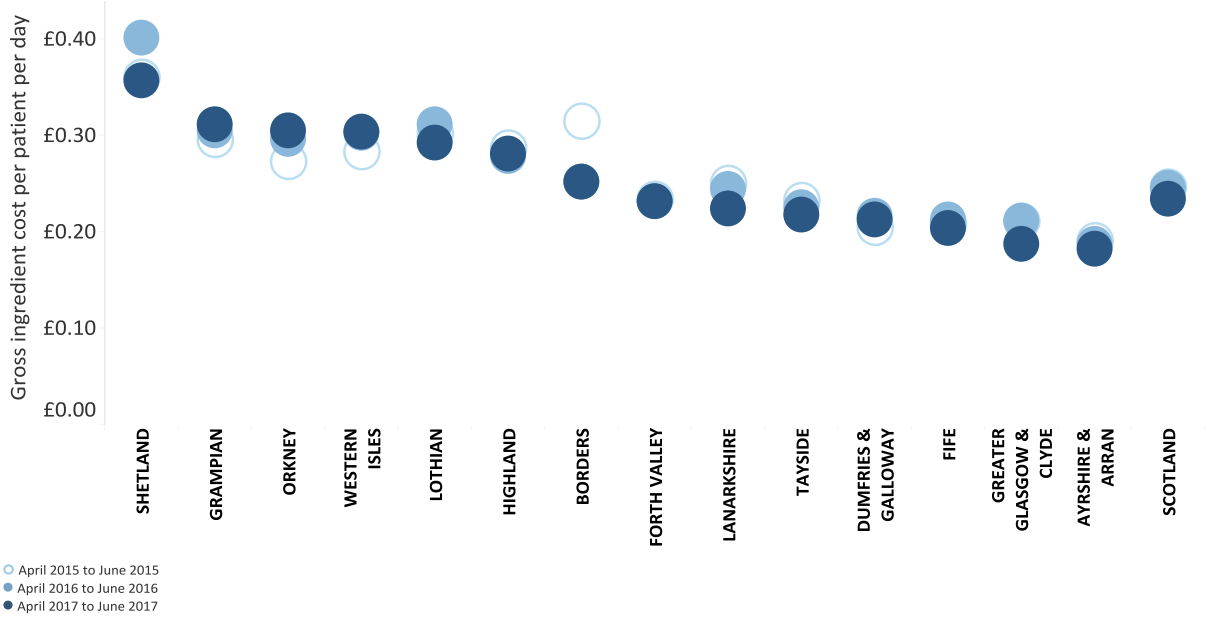
## Self-Monitoring of Blood Glucose (SMBG)

The graph below shows the average cost per day of blood glucose test strips per patient prescribed treatments for diabetes, varying almost two-fold from 17p to 34p per day.

**Average cost per day of Blood Glucose Test Strips per patient prescribed treatments for Diabetes (Antidiabetic Drugs and/or Insulins)**
**April 2017 to June 2017**




**Average cost per day of Blood Glucose Test Strips per patient prescribed treatments for Diabetes (Antidiabetic Drugs and/or Insulins)**
**April to June of 2015 to 2017**



Guidance on when SMBG is deemed appropriate for patients with type 2 diabetes is outlined in the Guidance for Clinicians section. SMBG should be prescribed in line with local MCN and formulary recommendations. There is no evidence to suggest greater clinical benefit is achieved by using more expensive test strips over the less costly ones and therefore Boards should select appropriate formulary products. PRESCQIPP provides a framework to support Boards with this decision making. Several Health Boards have reduced their cost per patient for SMBG, and the work undertaken in Borders and Ayrshire and Arran highlights an approach which can be adopted.

**Case Study – NHS Ayrshire and Arran (A&A) and NHS Borders**

**Key learning**
Appropriate use of SMBG.

**The Components**

***Selection of Blood Glucose Meters and Test Strips***

In A&A the Prescribing Support Team worked with the local diabetes team to get agreement on identifying formulary blood glucose meters and strips. They set up a focus group with pharmacists, nurses, GPs and patients with type 1 and 2 diabetes to discuss the strips on the market and the importance of clinicians having a limited choice of meters to be familiar with. The patients' most important consideration in a preferred meter was accuracy. A short list of meters was scored against the criteria chosen by the focus group, considering cost, reliability of supplier as well as meter size and display. The meter and strip with the best score was put forward to the formulary management group and accepted.

***Implementation of Formulary Choices***

NHS Borders undertook a similar process to identify a cost-effective choice. To implement the agreed choice for eligible patients with type 2 diabetes, the Prescribing Support Team identified all of the patients eligible for a new meter. The team worked in collaboration with practices to ensure all patients were sent a letter explaining the changes, had formulary strips added to their repeat record and knew how to access a new meter. The project was delivered in collaboration with the test strip supplier who visited all practices to provide meters for patients and information for both practice staff and patients. Scriptswitch was used to ensure that the cost-effective first line choice was highlighted.

**The Benefits**

Clear guidance is available in both formularies on choices of meters and test strips, and in NHS Borders this also includes the local diabetes team agreed approach to the frequency of monitoring in type 2 diabetic patients depending on their diabetes medication regimen.

NHS Borders analysed data on the switch in test strips and although the overall patient numbers and quantity of test strips increased, total spend has decreased significantly.

## Scottish Therapeutics Utility

The Scottish Therapeutics Utility (STU) is a software program aimed at improving the quality of repeat prescribing in NHS Scotland. A number of searches are being developed for STU based on the data within this document. These will enable clinicians to quickly identify patients who may benefit from a review of their diabetes medicines. Boards will be notified through their Scottish Practice Pharmacy and Prescribing Advisors Association member(s) when the searches are available.

## Glossary

BMI – Body Mass Index
CKD – Chronic Kidney Disease
DPP-4 Inhibitor - Dipeptidylpeptidase-4 Inhibitors
GLP-1 Agonist - Glucagon-like peptide-1 receptor agonists
HBA1c - Glycated Haemoglobin
MCN – Managed Clinical Network
NTI – National Therapeutic Indicator
SGLT-2 Inhibitor - Sodium-glucose Cotransporter-2 Inhibitors
SIGN – Scottish Intercollegiate Guidelines Network
SMBG – Self Monitoring of Blood Glucose
SMC – Scottish Medicines Consortium
STU – Scottish Therapeutics Utility