The diabetes review: A guide to the basics. Updated December 2020

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If treated suboptimally, type 2 diabetes can have devastating long-term complications, including cardiovascular disease, renal disease and blindness; however, such complications can be prevented with early effective diabetes engagement and management. A crucial part of diabetes care is the clinical review, which ideally each person with type 2 diabetes should undergo at least annually. Often this annual review is undertaken by more generalist rather than diabetes specialist healthcare professionals.

This article is a guide to the basics that healthcare professionals should be aware of to effectively review a person with type 2 diabetes, related to the 15 healthcare essentials advocated by Diabetes UK. First published in 2019, this article has undergone an update at the end of 2020 to keep pace with recent guidance and resource publications, and to reflect changes in working practices in light of the COVID-19 pandemic. Useful resources for both healthcare professionals and individuals with type 2 diabetes are signposted throughout the article to facilitate enhanced learning.

A tsunami of type 2 diabetes remains upon us. Since 2019, a further 200 000 people in the UK have been diagnosed with diabetes, totalling up to 3.9 million people, with a further 1 million suspected to have undiagnosed type 2 diabetes and a staggering 12.3 million thought to be at risk of developing the condition (Diabetes UK, 2020a). These numbers have doubled over the last 20 years and are set to increase further to an estimated 5.3 million people living with diabetes by 2025.

Type 2 diabetes is predominantly a progressive disorder defined by deficits in insulin secretion and action that lead to abnormal glucose metabolism and related metabolic derangements. Significant complications include those that are macrovascular – for example, cardiovascular disease – and those that are microvascular – including nephropathy, retinopathy, neuropathy and erectile dysfunction.

Globally, in 2019, there were expected to be 4.2 million deaths due to diabetes complications: one death every 8 seconds (International Diabetes Federation, 2019). However, research demonstrates that complications and premature mortality could be avoided with early, appropriate lifestyle and medical treatment of all risk factors (King et al, 1999; Gæde et al, 2016). The aim of type 2 diabetes care is to give a timely, holistic approach to include not just the management of hyperglycaemia but also to cardiovascular and additional risk factors, so that we can add “years to life and life to years”.

Two recent publications by NHS England have thrown further emphasis on the need for optimal diabetes management, showing that a third of COVID-19-related deaths in hospital were in people with diabetes (Barron et al, 2020; Holman et al, 2020). While some of the risk factors relating to adverse events with COVID-19, such as age and
A useful approach to individualising HbA1c targets is advocated by Inzucchi et al (2015), and is shown in Figure 1.

**Approach to management of hyperglycaemia**

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**Treatment escalation**

The management of those with suboptimal HbA1c levels is set out in the NICE (2015a) NG28 guidance (currently under review) and, more learning. The 15 healthcare essentials are discussed in the order they appear in publication, without reference to order of importance. It is widely recognised that in type 2 diabetes, education and motivation towards a healthy lifestyle is a significant component of care.

**The 15 healthcare essentials**

1. **HbA1c test: glycaemic review**
   - **The NICE (2015a) NG28 guideline recommends that, in adults with type 2 diabetes, HbA1c levels should be measured at 3–6-monthly intervals until they are stable on unchanging therapy, and thereafter at 6-monthly intervals. Note, however, that the HbA1c blood test may not be reliable for certain cohorts, such as those with haemoglobinopathies, severe anaemia or HIV. In such cases, there may be a need to use other tests, such as fructosamine levels, in discussion with the local specialist diabetes team.**

   There is debate around optimal HbA1c levels, but most certainly one size does not fit all, and targets should be individualised based on many factors, such as age, duration of diabetes and frailty. A useful approach to individualising HbA1c targets is advocated by Inzucchi et al (2015), and is shown in Figure 1.
recently, in the SIGN 116 guidance (SIGN, 2017) and the joint consensus report from the American Diabetes Association and European Association for the Study of Diabetes (Buse et al, 2020). All these national and global diabetes guidelines and consensus statements advocate lifestyle advice with metformin as the first choice of oral therapy, unless not tolerated or contraindicated.

When individualised glycaemic targets remain unmet with metformin and diet/lifestyle alone, the more recently published guidance advises clinicians to consider any other comorbidities a person may have, to include cardiovascular disease, renal disease, obesity and risk of hypoglycaemia, before considering what might be the most appropriate therapy to “add on”. This gives acknowledgment to the various cardiovascular and renal outcomes trials for some of the newer therapies. A helpful GNotebook Shortcut (Figure 2) guides the choice of agent after metformin to ensure that the benefits outweigh the potential harm (Fernando, 2019).

**Treatment de-escalation**

In contrast to intensifying therapies for the treatment of raised blood glucose, there is also a need to consider de-escalating therapies in those who may have too low an HbA1c, or are experiencing hypoglycaemia. This is particularly relevant in people who are prescribed insulin and/or sulfonylureas. Those who are older, frail, have had significant weight loss or are receiving end-of-life care are a notable cohort at risk of overtreatment of hyperglycaemia (Strain et al, 2018). This can contribute to episodes of hypoglycaemia, which has significant implications in terms of quality of life, morbidity and even mortality (UK Hypoglycaemia Study Group, 2007; Frier et al, 2011).

**2. Blood pressure/hypertension review**

The treatment of hypertension is the single most effective intervention to reduce the risk of macrovascular complications in type 2 diabetes (Yudkin et al, 2010). A meta-analysis by Ray et al (2009) has shown that, for every 200 people treated over 5 years, reducing blood pressure by 4 mmHg prevented 13 cardiovascular events, compared with eight events by reducing LDL-cholesterol by 1 mmol/L and only two events by reducing HbA1c by 10 mmol/mol (0.9%). Indeed, the landmark UKPDS (UK Prospective Diabetes Study) showed that tight blood pressure control reduced the risk of overall diabetes-related endpoints by 24% (UKPDS Group, 1998).

The pathways for the diagnosis and management of hypertension in diabetes are described in SIGN 116 and NICE NG136 guidance (SIGN, 2010; NICE, 2019a). Different target levels are deemed as optimal blood pressure control within these two guidelines, with SIGN advocating <130/80 mmHg for all and NICE recommending a target of <140/90 mmHg in people aged under 80 years and tighter control of <130/80 mmHg for those with co-existing chronic kidney disease. A guide to the recent NICE guidance is available in this journal (Milne, 2019).

At the time of writing, the landscape is also challenging in England, with the NICE target of <140/90 mmHg at odds with the Quality and Outcomes Framework indicator of <140/80 mmHg (NHS England, 2020). It is therefore relevant for clinicians to individualise blood pressure treatment, not only to avoid the overtreatment of the frail and elderly, but also to avoid undertreating those with compounding risk factors, such as renal disease, retinopathy, heart failure and a history of stroke.
People who are found to be hyper- or hypertensive should be reviewed monthly (or sooner if the blood pressure is particularly high or low). Lifestyle advice and the titration or de-escalation of medications, in line with NICE/SIGN guidance, until an appropriate blood pressure level has been attained, is indicated for effective management. In type 2 diabetes, an angiotensin-converting enzyme (ACE) inhibitor is generally the first-line drug of choice, or if not tolerated then an angiotensin receptor blocker (ARB); however, if the individual is a woman of childbearing potential, a calcium channel blocker (CCB) should be considered (SIGN, 2010; NICE, 2015c).

3. Cholesterol/lipid review
Having diabetes doubles the risk of having a heart attack or stroke (DUK, 2019b); therefore, managing lipids is an important component of the diabetes review. The recommended management of lipids is set out in SIGN 116 and NICE CG181 guidance (SIGN, 2010; NICE, 2014a). NICE advocates that, in primary prevention, those with a QRISK2 score above 10% should be offered atorvastatin 20 mg, titrating upwards to achieve a ≥40% reduction in non-HDL cholesterol. SIGN recommends that all those with type 2 diabetes aged ≥40 years be offered simvastatin 40 mg or atorvastatin 10 mg. In secondary prevention, both guidelines recommend atorvastatin 80 mg, if tolerated.

It is concerning that, although cardiovascular disease is the most common cause of death in diabetes, in a recent survey of those with and without a link to diabetes, only 2% spontaneously said that stroke was a complication of the condition, and only 6% mentioned heart attacks (Diabetes UK, 2018). There is a clear education piece missing around the association of complications with diabetes, which underlines the need to convey the seriousness of diabetes and its potential consequences, whilst being mindful to present a positive view that, with lifestyle modification and correct medical management, these complications can be minimised or prevented.

4. Eye/retinopathy screening
Diabetes is one of the leading causes of preventable sight loss in the UK (DUK, 2019b). All people living with diabetes should receive regular retinal screening by an optometrist or ophthalmologist. Previously, all people with diabetes were invited for retinopathy screening at least annually, but the UK National Screening Committee has considered relevant evidence relating to retinopathy screening intervals and, in 2020, Public Health England introduced an extension to screening to every 24 months for those with no retinopathy (Public Health England, 2020). This evidence-based decision was scoped prior to COVID-19 and implemented to ensure sufficient screening for those at greater risk of complications.

It is important that we promote the importance of attending for retinal screening at the diabetes review, but also that we manage other risk factors for vision-related outcomes, such as smoking, hypertension and glycaemic targets, so that retinopathy might be prevented or its trajectory changed.

Diabetic retinopathy is classified in four stages: background, pre-proliferative, proliferative and maculopathy. Early detection and treatment of retinopathy is vital in halting this progression. See Min et al (2020) for a factsheet on diabetic retinopathy.

5. Foot examination/assessment
Diabetes leads to 169 amputations every week, equivalent to 24 amputations a day or one per hour (DUK, 2019b); however, only 25% of people with diabetes in the Diabetes UK (2018) survey said that foot problems could be a complication of diabetes. Clearly, again, this demonstrates the need not only to perform a foot assessment (checking for appearance, foot pulses, monofilament wire and vibration sensations) but also the need to educate the person in front of us that poorly managed diabetes can cause major foot problems, and to promote the importance of looking after their feet, being aware of any signs for concern and knowing what to do if such signs present.

Each area should have a relevant pathway for foot referrals to podiatry based on whether the foot is deemed to be low-, moderate- or high-risk. Immediate referral to a foot care specialist is vital for those with infection, active ulceration or suspected Charcot foot. There is a wealth of resources from Diabetes UK on foot care, including
Information Prescriptions, which have been separated into advice for the effective management of low-risk and moderate/high-risk feet. The resource “Touch Your Toes” is valuable in a remote consultation, when an effective foot assessment is one of the most challenging aspects to achieve.

Full guidance on diabetes foot care and the management of painful neuropathy is described within SIGN 116 (SIGN, 2010) and NICE NG19 and CG173 guidance (NICE, 2013; 2015b). The foot examination is not easily learnt from a textbook; however, NHS Scotland has some good illustrative modules, including videos on how to physically check the foot (available at: www.diabetesframe.org).

6. Renal assessment

People who have diabetes in addition to chronic kidney disease (CKD) have an approximately 50% higher risk of end-stage renal disease, cardiovascular complications and death than those at a similar level of renal disease without diabetes (DUK, 2019b). Therefore, assessment and management of estimated glomerular filtration rate (eGFR) and urinary albumin levels are a significant element of the diabetes review. Reducing other risk factors for cardiovascular disease (e.g. lipids, blood pressure and unhealthy lifestyle behaviours) in this cohort is vital.

Prescribing safely and conveying crucial sick day guidance (Down, 2020) to avoid acute kidney injury should be part of the diabetes review. A useful acronym for the medications that may need to be temporarily stopped during illness/periods of dehydration is SADMANS, as shown in Table 1. Once the person is feeling better and able to eat and drink for 24–48 hours, these medications should be restarted unless renal function remains of concern.

In addition to SIGN 116 and NICE CG182 guidance (SIGN, 2010; NICE, 2014b), a helpful consensus statement on screening for and monitoring diabetic kidney disease, complete with a quick-reference screening/monitoring tool, has been published in Diabetes & Primary Care. There are also many patient and healthcare professional resources produced by Kidney Care UK and the Think Kidneys.

All those with CKD stage ≥3 and/or confirmed positive urine microalbumin should be offered a statin without the need for a QRISK2 assessment, and should be offered an ACE inhibitor or, if this is not tolerated, an ARB. Adding a sodium–glucose cotransporter 2 inhibitor with proven renal benefit, as per licence, should also be considered (Perkovic et al, 2019, Heerspink et al, 2020).

A useful chart outlining the frequency of measuring and reviewing eGFR in those with diabetic kidney disease can be found in Table 2 (NICE, 2014b).

7. Diet and lifestyle advice

As with all long-term conditions, the backbone of the diabetes review needs to be the delivery of appropriate and tailored lifestyle advice. This has gathered momentum recently with the results of the DiRECT study (Lean et al, 2018), which has demonstrated the possibility of halting the progression of type 2 diabetes and even inducing remission, by use of a calorie-restricted diet. NHS England has recently begun the roll-out of pilot sites to offer very-low-calorie diets for people with type 2 diabetes, and findings from these interventions, including their sustainability, will be eagerly awaited.
Currently, however, a search on social media sites will lead to an array of conflicting advice about diets and activity schedules advocated for the prevention, remission and treatment of type 2 diabetes. It is important that we give advice to people with diabetes based on evidence, and that we signpost those in our care to trusted sources, such as the Diabetes UK dietary guidelines (Twenefour et al., 2018), so that people can make appropriate and safe lifestyle changes.

Dietary foundation stones are to eat appropriate portion sizes and high proportions of foods found in Mediterranean-style diets, such as vegetables, fruits, whole grains, fish, nuts and pulses, and to eat less red and processed meat, refined carbohydrates and sugar-sweetened beverages. Reduced salt intake is also important. A Mediterranean meal plan is available from Diabetes UK at: https://bit.ly/2lrY1Tv.

It is important to be sensitive to the cultural and socioeconomic implications that may impact on a person when recommending any dietary intervention. Meta-analyses of dietary studies show that positive effects on diabetes relate more to weight loss, rather than the specific diet, and to motivational support to sustain dietary changes.

Any increase in activity is beneficial, and this needs to be individualised based on a person’s physical ability. It is suggested that 150–300 minutes of moderate exercise per week, including aerobic and resistance activities, with no more than two days lapsing without exercise, should be encouraged (World Health Organization, 2020).

8. Emotional and psychological support

Unlocking the key to behaviour change and evoking lifestyle adjustment is reliant on the successful engagement of the person with diabetes. Factors such as diabetes distress, anxiety and depression can thwart such engagement and often result in non-attendance at reviews, challenges in following lifestyle advice and not taking medications as prescribed. The prevalence of depression is approximately twice as high in people with diabetes as in the general population (Kreider et al., 2017). The language we use in talking about diabetes is important in building relationships and providing effective care. NHS England (2018) has published a document which can help healthcare professionals in achieving effective conversations in diabetes (available at: https://bit.ly/2tpAmT9).

The United Nations (2020) has highlighted that, “Although the COVID-19 crisis is a physical health crisis, it has the seeds of a major mental health crisis as well.” The emotional and mental wellbeing of those we are caring for will remain paramount as we move forward into the “new normal” and beyond. Now more than ever, we need to screen for any emotional and psychological factors, and signpost to services and other healthcare professionals that can help to manage these effectively, during our consultations. The journal Diabetes & Primary Care has produced a factsheet on mental health to help encourage discussions and actions to promote and improve wellbeing (Bagshaw, 2020).

There is growing evidence around the use of “social prescribing” in type 2 diabetes (Polley and Pilkington, 2017). This encourages people to engage with community activities, such as walking and cycling clubs and other local social initiatives, which facilitate social interactions and can be particularly helpful for those experiencing low motivation levels and loneliness. As we emerge from lockdown and begin to see the implications of the pandemic, this service will be invaluable.
9. Access to diabetes education

It is estimated that a person with diabetes will spend at most 2–3 hours a year with their healthcare professional; for the remaining 8757 hours of the year, they are on their own. With less than 10% of people attending formal diabetes structured education (Diabetes UK, 2015), due to a variety of barriers, we need to consistently incorporate education within the diabetes review and encourage engagement with educational courses to ensure that the seriousness of long-term complications is conveyed, alongside the benefits of effective self-care and management. Resources such as Diabetes UK’s Information Prescriptions and Learning Zone are an excellent way of facilitating this. Not only the person with diabetes but also their families and carers should be signposted to further information and support.

The NHS 10-Year Plan has diabetes education high on its priorities, and it includes the pledge to “expand the provision of structured education and digital self-management support tools” (NHS England, 2019). As face-to-face and group-based education had to be halted because of the COVID-19 pandemic, the positive was that this pledge to expand the digital element of diabetes education accelerated at pace. Free online digital education is now widely available across the UK. An example of a digital app demonstrating positive outcomes is My Diabetes My Way, which is offered throughout Scotland and certain areas of England. NHS England has a webpage listing approved digital apps that are appropriate for people with type 2 diabetes (available at https://www.nhs.uk/apps-library).

Historically, there has been a tendency to offer structured education at diagnosis, but with progressive and continual changes in diabetes care due to ever-emerging research findings and new therapies, there is a need to encourage ongoing and refresher education rather than taking a one-off approach.

10. Care from diabetes specialists

The realisation of limitations in knowledge, skills and experience when caring for people with diabetes is important. Type 2 diabetes can predominantly be managed in primary care, but there are times when referral to diabetes specialist teams may be indicated. Diabetes care models such as the Portsmouth Super Six (Nicholson et al, 2016) have set out such circumstances, and these are generally inpatient care; antenatal diabetes; poorly controlled type 1 diabetes, including adolescents; low eGFR and people on dialysis; foot complications; and insulin pump services.

NHS England has recently supported the publication of a document on delivering diabetes care in the Primary Care Networks (Ali et al, in press). This sets out best practice for Primary Care Networks in the delivery of diabetes care, suggesting the formation of a Diabetes Specialist Team (DIAsT) within each network, and advocating tiers of care across primary and secondary care, defining which groups require more specialist care.

Effects of the COVID-19 pandemic have left all services facing significant workloads in terms of delayed or missed reviews to catch up on; indeed, it is estimated that during the first lockdown alone there were over 40,000 missing new diagnoses of type 2 diabetes (Carr et al, 2020). It is vital that all services work together as an integrated team so that we can deliver the best care and use resources efficiently; for example, by minimising visits to healthcare services by offering “one-stop shops”, where blood tests, blood pressure checks and foot examinations can be done together, rather than in separate visits; and by ensuring that the person with diabetes is seen by the most appropriate healthcare professional rather than duplicating care.

11. Influenza and pneumococcal vaccinations

People with diabetes should be offered an influenza vaccination annually and a pneumococcal vaccination as a one-off unless they meet the criteria for more frequent pneumococcal vaccination (Diabetes UK, 2019a). People with diabetes are at increased risk of developing severe complications from influenza virus infection, with three times the likelihood of hospitalisation and four times the risk of intensive care admission once hospitalised (Allard et al, 2010; Hulme et al, 2017).

12. Good care in hospital

One in five inpatients with diabetes will have an episode of hypoglycaemia during their hospital stay. The National Diabetes Inpatient Audit from 2019 shows that, although diabetes care is continuing to improve for inpatients, 30% of drug charts contained medication errors and
the rates of some important and life-threatening harms remain unchanged, including severe hypoglycaemic episodes in inpatients with type 1 diabetes, hospital-acquired diabetic ketoacidosis and hospital-acquired hyperosmolar hyperglycaemic state (NHS Digital, 2020). This serves to underline the theme throughout this article of encouraging self-management of diabetes so that individuals are empowered to better care for themselves, in the hope that such startling inpatient statistics will see an improvement. Specific advice is available on how to prepare for hospital admission and surgery (Dhatariya, 2018), and the recently published Getting It Right First Time report (Rayman and Kar, 2020) serves to underline the importance of good preparation for planned admissions and self-management of insulin administration.

13. Support with any sexual problems
Discussion of sexual dysfunction can be difficult to initiate; however, it is estimated that 35–90% of men with diabetes globally are affected by erectile dysfunction, and 69% of women with type 2 diabetes are estimated to be affected by sexual dysfunction (Malavige and Levy, 2009; Clayton et al, 2018).

Identification of reversible or modifiable risk factors, including lifestyle or drug-related influences in men, is described in a NICE (2019) Clinical Knowledge Summary. The summary also provides guidance on management, to include pharmacological treatment. It is relevant to advise that erectile dysfunction can respond well to a combination of lifestyle changes and drug treatment, advocating, where appropriate, weight loss, smoking cessation, reduced alcohol consumption, improving HbA1c, and increasing physical activity. Psychosexual counselling may also be of benefit.

In women, there is excellent guidance available at: https://doi.org/10.1016/j.mayocp.2017.11.002.

14. Help to stop smoking
It has been evident throughout this article that smoking cessation is of paramount importance in reducing risk factors relating to the long-term complications of diabetes. Encouragement and support with smoking cessation is significant and highly beneficial. There are a vast array of services to help with smoking cessation available from the NHS.

15. Specialist care for those planning to have a baby
Preconception advice for women of childbearing age is an important consideration at the diabetes review, as 7 out of 8 of women with diabetes are inadequately prepared for pregnancy (NHS Digital, 2019). Women should be advised to aim for an HbA1c of <48 mmol/mol (6.5%), take folic acid at the prescription-only strength of 5 mg daily and have a medication review to suspend any medications that may be teratogenic. With regard to antidiabetes medications, only metformin and insulin are thought to be safe to use in preconception and pregnancy (NICE, 2015c).

Medication review
Although not specified in the Diabetes UK list of essentials, medication review is clearly a crucial part of the annual review. In reviewing medications, particularly when intensifying treatment, it is always important to look back and assess which medications have been effective, and to be alert to stopping those that are ineffective. Some studies suggest that up to a third of people with type 2 diabetes do not take their prescribed diabetes medications (McGovern et al, 2018), so it is useful to ascertain whether they are being taken as prescribed.

As previously discussed, always be observant for any overtreatment of conditions such as hyperglycaemia and hypertension, especially in the frail and/or elderly, and consider de-escalation of medications in these circumstances. We have already discussed sick day guidance and medications to suspend when unwell and susceptible to dehydration.

Those taking medications that can induce hypoglycaemia (i.e. sulfonylureas, prandial glucose regulators and insulin) will need special consideration, with discussion of hypoglycaemia and its prevention, signs, symptoms and management. A patient information leaflet on hypoglycaemia is available for free from TRENDS UK (2020a) at: https://bit.ly/21988222. It is also essential to discuss DVLA (2016) regulations on driving and hypoglycaemia and to support access to capillary blood glucose monitoring. A how-to guide on assessing fitness to drive is available from Brown and Diggle (2017). Review of glucose
self-monitoring, including correct technique, timing, interpretation of results and actions to take depending on levels, should be undertaken at least annually (TRENDS-UK, 2020).

Those taking injectable therapies, such as insulin and glucagon-like peptide-1 receptor agonists, should be reminded about the storage, disposal, preparation and timing of their injections, and observation and palpation of injection sites is relevant in ensuring correct injection technique and site rotation to avoid the formation of areas of lypo-hypertrophy (Injection Technique Matters, 2018).

All healthcare professionals who prescribe and/or administer insulin should be competent and safe in this role, and an essential aspect of continuing professional development would be undertaking a suitable insulin safety module, such as the free, MHRA-recommended Six Steps to Insulin Safety, which was updated at the end of 2020.

Summary
This has been a whistle-stop tour of the diabetes review, with signposts to numerous useful resources looking at specific areas in greater detail. There is much to consider, but hopefully this article has highlighted the need for a multifactorial approach in effective diabetes management, not just the management of blood glucose and HbA1c levels. As we tackle the type 2 diabetes tsunami before us in new and challenging ways, never forget the very basics of Engagement, Education, Enablement and Empowerment, in order that healthcare professionals and those in our care, including their families and carers, may learn to surf the tidal wave with confidence.


Diabetes UK (2019b) U1s, diabetes and a lot of facts and stats. DUK, London. Available at: https://bit.ly/317q2Rd (accessed 29.11.20)

Diabetes UK (2020a) Number of people with diabetes reaches 4.8 million. DUK. London. Available at: https://bit.ly/3ohVXz (accessed 22.11.20)

Diggle J (2017) How to…: diagnose and monitor CKD. Diabetes & Primary Care 19: 59–60


Injection Technique Matters (2018) Best practice guideline to support correct injection technique in diabetes care. TRENDS-UK. Available at: https://trend-uk.org/injection-technique-matters (accessed 30.11.20)

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