

# The Diabetes Blueprint

Transforming the lives  
of people with diabetes

This report was written, funded and distributed by Novo Nordisk  
in collaboration with Midlands Engine and Midlands Health Alliance

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This report was written, funded and distributed by Novo Nordisk in collaboration with Midlands Engine and Midlands Health Alliance. This follows a virtual roundtable discussion held in July 2021 hosted by the Midlands Health Alliance, Midlands Engine and Novo Nordisk to consider the impact of diabetes in the Midlands.

# Foreword

Sir John Peace



Sir John Peace,  
Chairman of  
Midlands Engine

The Midlands Engine partnership works to drive economic prosperity for communities in every part of our region. There is a fundamental connection between economic prosperity and health. As such, we recognise that preventing and addressing ill health must remain in sharp focus as we seek to actively improve quality of life in the Midlands.

Coronavirus has reminded us all of the absolute value of good health and indeed, of the enduring and stark health inequalities experienced by too many communities. If we are to level up the economy, we must also level up health and this must be part of our work to rebuild and recover, post Covid-19.

It has been shocking to learn about the prevalence and impact of diabetes in the Midlands. One in every 13 adults has received a diagnosis of diabetes, the highest of any region in England.<sup>1</sup> Diabetes is a complex condition and, if untreated, can go on to cause many other serious complications.<sup>2</sup> Beyond the impact on the lives of those diagnosed, the consequences for the economy are also significant with major predicted increases in the number of working days lost to this serious condition.

It is essential that we, as a region and a nation, take action to tackle this far-reaching challenge. Here in the Midlands, a globally leading centre for health, MedTech and life sciences, innovative and ground-breaking research, care and workplace-based projects are being driven forward right now, as we work to reduce the impact of diabetes and support the wellbeing of people affected. By investing now, and with pace and scale, in the clinical research we need alongside the health improvement programmes as set out in this blueprint, we can and we will accelerate change for the good of our communities and, in turn, our economy.

I am delighted that our Midlands Engine Health partnership has been involved in the development of *The Diabetes Blueprint*, and look forward to continued collaboration as we accelerate our work in the Midlands and share knowledge with other UK regions to bring learning and benefits to the nation.



# Foreword

Professor Melanie Davies



**Professor Melanie Davies**  
Co-Chair of the  
Midlands Health  
Alliance

Throughout my career I have researched and written about all aspects of diabetes care pathways, from prevention, to screening and diagnosis, through to treatment. I know only too well the impact of diabetes for patients, and I am passionate about improving the lives of people living with all types of diabetes.

In the Midlands we have a long history of pioneering diabetes care. In the 1950s Dr Joan Walker first introduced the concept of a diabetes team, with nurses going into the community, while working at the Leicester Royal Infirmary. This triggered a major shift in care nationally, and gained worldwide acclaim.<sup>3</sup>

Today we are lucky to boast some of the leading diabetes experts and research centres. Through the Midlands Health Alliance we work collaboratively to consider how research can achieve maximum impact and help to address key health needs, alongside how best practice and insights can be applied to treatment and care. As the Diabetes Blueprint shows, a wide range of projects have been launched in the region which seek to improve understanding and provide better support for people living with diabetes. Given the high prevalence of diabetes in the region, the Midlands is an excellent place for research, and to run pilot programmes testing new approaches and innovative treatments. We are keen to share learnings with other regions so that they can consider how work here can be adapted to support wellbeing and productivity in their communities. Though many of the schemes are at an early stage, a lot has already been learnt, and project teams across the region are working to evolve and improve initiatives to deliver the best possible outcomes.

A third of people who died in England's hospitals during the early phase of the COVID-19 pandemic had diabetes, which has only highlighted how important it is to ensure people with all forms of diabetes are supported to live well.<sup>4</sup> The pandemic has also exposed the way in which chronic conditions like type 2 diabetes disproportionately impact ethnic minority and disadvantaged communities. Many of the pre-existing health conditions that increase the risk of having more severe infection from COVID-19, including type 2 diabetes and obesity, are more common in ethnic minority groups and linked to the socio-economic environment.<sup>5</sup>

*The Diabetes Blueprint* is a great opportunity to highlight the fantastic work that is happening in the Midlands to address these important issues. This includes the work of the Midlands Health Alliance and the establishment of new regional clinical research networks for type 1 and type 2 diabetes to help share best practice across the region. It is also an opportunity to share learnings more widely so that people living with diabetes have access to the best possible support, no matter where they live.

# Introduction

Diabetes is one of this country's greatest health challenges, affecting one in every 14 people.<sup>6</sup> Its impact reaches beyond just the health of individuals, affecting people's quality of life and life chances, the NHS and other public services, and the economy. As the number of people living with diabetes continues to grow, so too could the prevalence of serious diabetes complications and its societal impact.

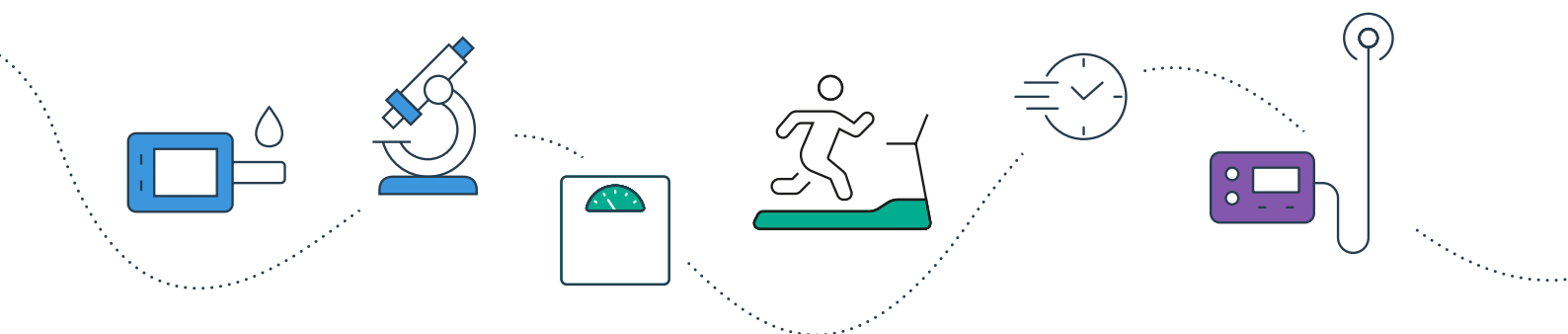
Prevention of type 2 diabetes, and work to discover and develop innovative medicines and health care services which improve the health and well-being of people living with all types of diabetes, are essential elements in the fight to reduce the impact of diabetes. However, this work cannot be done in isolation. Collaboration is vital in order to address the myriad factors driving the increase in type 2 diabetes and to ensure everyone living with diabetes receives the best, most appropriate care. Clinicians and patients should be empowered to work with partners from clinical research, the third sector, community organisations, businesses and across the NHS, as well as government and policymakers, to address this challenge.

The Midlands' world-leading universities and academic institutions, research and innovation infrastructure, NHS services and public bodies are home to a wide variety of expert partners who share an ambition to prioritise addressing the significant impact diabetes has on people's lives.

In July 2021, the Midlands Health Alliance, Midlands Engine and Novo Nordisk hosted a roundtable discussion to consider this impact. The roundtable brought together diabetes clinical experts and other partners from across the region to explore the challenge this impact poses to the health of the region's population and to the economy and how this might be addressed. This included identifying best practice already taking place within the Midlands and considering further opportunities for regional collaboration, to help improve outcomes for local people living with diabetes.

By bringing together these experts to discuss how to continue to tackle this challenge, it has been possible to develop a blueprint for improved health and socio-economic outcomes for people living with diabetes. This includes examples of successful projects and initiatives already underway across the Midlands.

By capturing and sharing key actions and principles in this report, partners within and beyond the Midlands will have tools at hand to implement new approaches, building on the work carried out by experts within the Midlands.



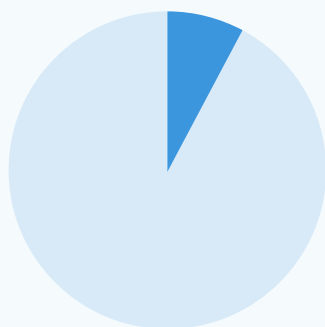
# What is diabetes?

Diabetes is a chronic disease that requires constant management. It occurs when the body cannot sufficiently produce, utilise, or respond to the hormone insulin. There are more than 4.9 million people living with diabetes in the UK. Without the right support and good management, it can lead to avoidable, serious complications such as heart attack, stroke, and amputation.<sup>6</sup>

The two most common types of diabetes are:

## Type 1

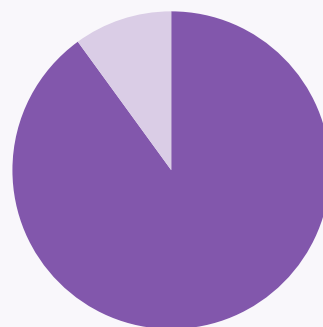
8%



Type 1 diabetes is a condition caused by an autoimmune reaction in which the body's immune system attacks the insulin-producing cells of the pancreas. As a result, the body produces very little or no insulin. Most commonly, type 1 diabetes develops in childhood but it can also develop later in life. It accounts for around 8% of diabetes cases in the UK.<sup>7</sup>

## Type 2

90%



Type 2 diabetes is the most prevalent form of diabetes. It develops due to prolonged insulin resistance and insufficient insulin production. It is seen primarily in adults and accounts for approximately 90% of all cases of diabetes.<sup>8</sup> While it is often linked to obesity and lifestyle factors, a person's ethnicity, or a family history of type 2 diabetes are also risk factors.

# Diabetes in the Midlands

## Prevalence



**1 in 13**

The Midlands has the highest prevalence of diabetes of all regions in England, with one in every 13 adults (aged 17+) having received a diagnosis.<sup>9</sup>



**644,190**

people across the Midlands were living with a diagnosis of type 2 diabetes in 2019/20.<sup>10</sup> However, national estimates suggest many people living with type 2 diabetes have not yet been diagnosed.<sup>2</sup>

## Type 2 Diabetes

There are a number of local factors that could be driving prevalence of type 2 diabetes within the Midlands, including an ethnically diverse population, greater than average levels of deprivation, and high levels of obesity.

**85%**

The most significant modifiable risk factor of type 2 diabetes is **obesity**, accounting for as much as 85% of the overall risk.<sup>6</sup>



**65.4%**

of adults in the East Midlands and ...



**66.8%**

of adults in the West Midlands are living with excess weight or obesity ...

**People from BAME backgrounds are up to six times more likely**

to develop type 2 diabetes frequently at a younger age and lower body mass index (BMI) than White Europeans.<sup>12,13</sup>

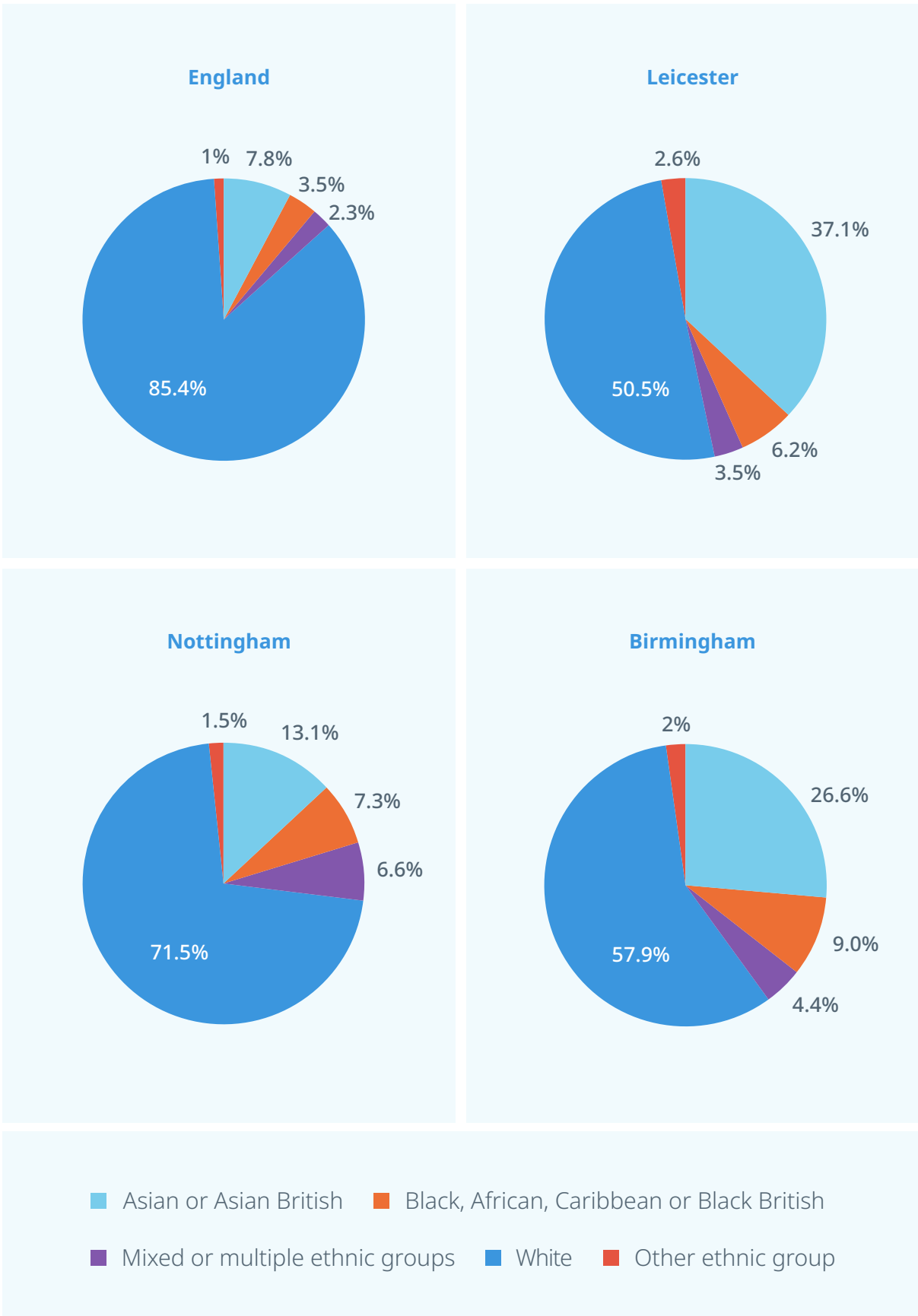
Compared to



**62.8%**

of the adult population across England.<sup>11</sup>

Population breakdown by ethnicity<sup>14</sup>





**Prevalence of type 2 diabetes is higher in areas of greater deprivation.<sup>15</sup>**

**24.8%** of the Midlands falls within the most deprived quintile of areas in England and **13.2%** are in the most deprived decile.<sup>16</sup>

**50%**

Research has found that for some people, combined lifestyle interventions - including diet, physical activity, and sustained weight loss - can be effective in reducing the risk of type 2 diabetes by about 50%.<sup>2</sup>

With the right support, care and treatment, people living with diabetes can lead healthy lives. However, potentially life threatening and debilitating complications are all too common.

**Diabetes complications**

Every week diabetes contributes to more than:<sup>6,17</sup>



**2100**

cases of heart failure in England



**420**

cases of heart failure in the Midlands



**515**

cases of heart attacks in England



**95**

cases of heart attacks in the Midlands



**690**

cases of strokes in England



**130**

cases of strokes in the Midlands



**415**

cases of renal replacement therapy in England



**80**

cases of renal replacement therapy in the Midlands



**130**

cases of amputations in England



**25**

cases of amputations in the Midlands



**300**

cases of potentially life threatening diabetes ketoacidosis in England



**55**

cases of potentially life threatening diabetes ketoacidosis in the Midlands

## Impact of diabetes on the NHS

Aside from the significant human impact, diabetes complications also have a significant impact on NHS resources. Between April 2019 and 2020, there were:

	in England	in the Midlands
diabetes-related hospital admissions	2,020,880	415,890
diabetes-related hospital bed days	7,648,485	1,566,290
diabetes-related healthcare costs	£4,557,733,283	£899,453,124

# 80%

of NHS spend on diabetes goes on treating complications associated with diabetes.<sup>2</sup> The risk of developing these complications can be reduced through timely therapeutic interventions to control blood glucose, cholesterol, and blood pressure.<sup>18</sup>



## Impact of diabetes on the economy

Beyond this, diabetes-related health complications and premature death also result in costs to the economy through working days lost, either through sickness absence or exit from the labour force.<sup>19</sup>

# 2–3x

People with diabetes have a sickness absence rate 2–3 times greater than the general population.<sup>20</sup>

# 30%

Living with diabetes increases a person's chances of exiting the labour force by 30%, according to global research.<sup>21</sup>

## Type 2 diabetes

For type 2 diabetes, the most common form of diabetes, there are substantial productivity savings possible over the next 10 years if diabetes control can be improved, both for the Midlands' economy and the UK's more broadly:

# £1.795bn

potential productivity savings across the UK.<sup>19</sup>

# £269.25m

The Midlands Engine Observatory estimates that this could represent potential productivity savings of £269.25 million in the Midlands.<sup>22</sup>

# The Midlands Approach

By looking at diabetes end to end across the Midlands region, a clear picture starts to emerge of priority areas, where focusing new approaches and fresh thinking will have the greatest impact:

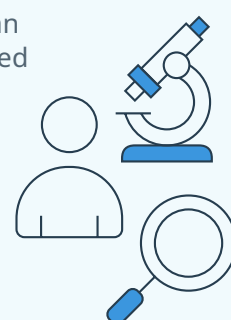
- 1 Without supporting excellence in **clinical research** in the region, it cannot be guaranteed that patients are benefiting from the latest medical knowledge and advances.
- 2 Given the known risk factors for developing type 2 diabetes, including obesity, focusing on **prevention** has the potential to help reduce the impact and consequences of diabetes in the region by reducing the number of people living with the condition.
- 3 When people have been diagnosed with diabetes, they must be supported by excellent **treatment and care** which responds to their needs, is based on clinical best practice and enables them to live without restrictions as far as is possible.

The case studies below provide examples of work the Midlands is already leading to address each of these key areas and to help reduce the impact of diabetes within the region.

## 1. Clinical Research

By establishing a strong research infrastructure in the Midlands through the Midlands Health Alliance, clinical researchers have sought to increase activity, share best practice, and apply research findings in delivery of care. In particular, there is a need for greater inclusivity in research, so that populations that are particularly affected by diabetes are able to participate in research, including through clinical trials. Studies have shown that hospitals that engage in clinical research often have better health outcomes than hospitals that do not.<sup>23</sup> Enabling under-served communities to access research and supporting researchers to diversify research cohorts will address disparities, improve awareness and understanding, and help to tackle health inequalities.

In addition, developing its research infrastructure and supporting research projects is an investment opportunity for the region, helping to create new and varied jobs and contribute to the local economy. Just as unemployment and poverty can contribute to poor physical health, improved quality of work can lead to improved health: by improving health and wellbeing, productivity can also potentially be increased.<sup>22,24,25</sup>



## Centre for Ethnic Health Research – Improving Inclusivity

- There is a well-established history of health research failing to address the needs of ethnic minorities; never has this been in sharper relief than when seen in the context of the COVID-19 pandemic, which has further highlighted ethnic health disparities.<sup>26</sup> Ethnic minority groups are more likely to suffer from poorer health outcomes and health and social care inequalities in general. As a result of challenges with clinical research engaging people from ethnic minority communities, it is difficult to obtain good quality research information related to the needs and experiences of these groups, despite the urgent importance of doing so.
- Researchers in the Midlands are leading the field in supporting clinical research teams to change the narrative and drive towards genuinely inclusive research. The Centre for Ethnic Health Research, based in the East Midlands, is committed to addressing inequalities in healthcare and clinical research. While the internationally recognised South Asian Health Foundation, first founded in the West Midlands, has a particular focus on addressing health inequalities that affect the South Asian community.
- By collaborating with local communities and other partners, the Centre for Ethnic Health Research in Leicester has established a **toolkit for Increasing Participation of Black, Asian and Minority Ethnic (BAME) Groups in Health and Social Care Research**. It lays out measures for understanding communities that research should involve, for undertaking effective research, for conducting effective recruitment, and for providing effective feedback. Further, the report shares a number of examples of the impacts of non-inclusive, and inclusive research projects.



With those from Black African, African Caribbean and South Asian backgrounds at higher risk of developing type 2 diabetes, this toolkit is essential for diabetes research teams across the UK.<sup>13</sup> It has the potential to vastly improve understanding of the condition by empowering research teams to carry out more inclusive research.

*“Inclusive research, which reflects all our communities is so important in helping ensure health care is appropriate, and helps reduce health inequalities. Work with the Centre for Ethnic Health Research to develop the toolkit means that clinical research teams across the region and beyond can be equipped to ensure their work is genuinely inclusive, and consequently more useful and impactful. Though its use goes far beyond diabetes, the increased risk profile of those from Black African, African Caribbean and South Asian backgrounds of developing type 2 diabetes means that the toolkit is an essential consideration for researchers seeking to expand our understanding of this condition.”*

Clinical lead, Centre for Ethnic Health Research  
**Professor Azhar Farooqi**

## Midlands Health Alliance Research Network

- The Midlands Health Alliance provides a unique regional infrastructure to support a coordinated strategy for maximising the impact of clinical research across the Midlands.
- In 2020, the Midlands Health Alliance Research Network for Type 1 Diabetes was founded, bringing together clinicians to help build a consistent region-wide approach to the care, treatment and outcomes of type 1 diabetes patients across the Midlands. Shortly afterwards, the Midlands Health Alliance Research Network for Type 2 Diabetes was also established.
- Through these networks it is anticipated that patients across the Midlands will benefit from **greater access to new technologies**. Further, through collaboration the alliances will collect key data to identify areas for service improvement and understand the impact of interventions, like those focusing on the management of hypoglycaemia (where blood sugar levels drop too low and which can be dangerous if not treated quickly). Data will also help to **identify areas where research and understanding of the impact of diabetes is lacking**. The type 1 and type 2 diabetes research networks will be ideally placed to support the work of the **national Health Informatics Collaborative (HIC)**, led from the Midlands. This will explore how clinical data and real-world evidence can be used to help transform diabetes care.
- These networks are therefore ideally placed to support translation of research findings into clinical practice across the region, as well as supporting the sharing of best practice and insights at a national level.

By bringing key organisations and diabetes clinical researchers and experts from across the region, the Midlands Health Alliance is working to help ensure that, no matter where they live in the area, diabetes patients will be able to access the latest, most innovative treatments, and the best care pathways.

## Addressing sleep problems for people with type 2 diabetes

- Obstructive sleep apnoea is very common in people living with type 2 diabetes, and is associated with microvascular complications, including retinopathy (eyesight difficulties), nephropathy (kidney problems) and neuropathy (nerve problems).<sup>27</sup>
- At the University of Birmingham, researchers sought to improve understanding of this relationship, to establish whether continuous positive airway pressure would reduce the development of complications in patients with type 2 diabetes. The feasibility study began in 2018, with study-end-visits ongoing during 2021.
- This work will inform a future clinical trial that could potentially have a significant impact on reducing type 2 diabetes microvascular complications, which could help reduce the burden on patients, minimise the impact of complications on health systems, and decrease the number of lost working days resulting from diabetes-associated complications.

With the project being run from the University of Birmingham, local clinical networks are best placed to participate in and benefit from the full clinical trial in the coming years.



## The M3 Research Programme

- Type 2 diabetes usually occurs in people aged over 40.<sup>28</sup> However, the prevalence of type 2 diabetes in younger people is becoming an increasing challenge. New NHS data has revealed that there are almost 123,000 children and young adults under the age of 40 years in England and Wales living with the condition, over 1,500 of whom are under the age of 19.<sup>29</sup>
- People with early-onset type 2 diabetes can have very different lives to older people living with the condition, but care and treatment to help people self-manage their diabetes has traditionally been based on evidence from research studies that relate to the experiences of older people with type 2 diabetes.<sup>30</sup> As a result, there is a gap in the availability of research evidence related to the experiences of younger people with type 2 diabetes, which are crucial to understand in order to help inform improvements to their care and prevent worse outcomes.
- The M3 research programme, led from the Leicester Diabetes Centre, is undertaking work with partners across the Midlands to establish and test a new model of care that will be tailored specifically for those who develop early-onset type 2 diabetes. The programme is actively working to engage younger people living with the condition to help develop services for them. This new approach to care, which will be trialled in Leicester and Derby alongside two other parts of the country, will be co-produced in partnership with people aged between 16 and 40 living with type 2 diabetes, to help ensure the development of treatment that meet their needs. The development of type 2 diabetes at a young age often occurs alongside other health conditions, including obesity, high blood pressure and mental health problems. Early intervention and support to self-manage their diabetes offers the opportunity to reduce their risk of developing further longer-term health complications.<sup>31</sup> The M3 programme will ensure that the research undertaken is accessible and relevant to people from a variety of backgrounds. This will then help to inform the development and testing of a new holistic approach to addressing multi-morbidity in early-onset type 2 diabetes. This includes through a planned large 'consensus conference', where people with different life experiences will come together with the research team and NHS staff to collectively design the programme and model of care. A public involvement and peer support group is also being established to support engagement with younger people living with type 2 diabetes to help ensure a patient-centred approach to research and the development of new care models.
- The research will include data collection about living with early-onset type 2 diabetes to assess short- and long- term impact, alongside work to assess the effectiveness of the new approach.



By collaborating with partners to develop a person-centred, research- and data-based approach, the M3 Research Programme will deliver new models of care that offer the potential to benefit young people across the Midlands in the longer-term.

## 2. Prevention of type 2 diabetes

Diabetes diagnoses have almost doubled in the last 15 years – largely due to the rising number of cases of type 2 diabetes and it is estimated that 13.6 million people in the UK are at increased risk of developing type 2 diabetes.<sup>32</sup> The NHS has also estimated that one in ten people in England could be living with type 2 diabetes by 2034.<sup>33</sup> However, type 2 diabetes is preventable, which means that it is possible to reverse this trend.

While age, family history and ethnicity are all risk factors for type 2 diabetes, obesity is the most significant and modifiable one. It accounts for up to 85% of the overall risk of developing type 2 diabetes.<sup>6</sup> The Government is taking steps at a national level to improve the food environment, but preventing obesity and type 2 diabetes also depends on action by individuals, companies, communities, healthcare services and local government. Sedentary behaviour – sitting or lying down for long periods of time – has also been linked to the risk of type 2 diabetes.<sup>34</sup> Keeping people healthier and active for longer could therefore help improve quality of life, reduce pressure on the NHS and public services, and deliver a productivity dividend for the economy.

### Cities Changing Diabetes

- Within Leicester, the number of people recorded as living with type 2 diabetes has increased from 21,713 in 2012/13 to 31,245 in 2020/21, an increase of almost 45%.<sup>35,36</sup> This does not include those who have not yet been diagnosed, or those at risk of developing the condition. Leicester also has a large South Asian community, whose risk of developing type 2 diabetes is significantly higher than the white European population.<sup>37</sup> However, this increase in type 2 diabetes is not inevitable and Leicester decided to take action to change its trajectory.
- In 2017, Leicester joined the global Cities Changing Diabetes programme led by Novo Nordisk, University College London and the Steno Diabetes Centre in Copenhagen. Its aim is to stem the rise in type 2 diabetes by finding new ways to prevent and manage the disease in the complex social and cultural settings that cities create. The Leicester Cities Changing Diabetes programme is a joint working project funded and developed by Leicester Diabetes Centre and Novo Nordisk.
- Since the programme was started, a wide range of partners in Leicester have been working together to take forward several local projects to help improve the health of the city's residents and raise awareness of the risk factors associated with type 2 diabetes. One such project is 'United Leicester', which brought together the city's four professional sports clubs and elite hockey club to work with local schools to encourage pupils to be physically active. Following the success of the sports clubs working together, they are planning further longer-term work in partnership to help promote health and wellbeing amongst Leicester's population.



Cities Changing Diabetes works with community partners to support targeted initiatives to prevent type 2 diabetes, particularly among people at greatest risk of developing the condition.

**cities  
changing  
diabetes**

## Healthy Goals

- Through the Cities Changing Diabetes programme partners across Leicester, including Leicester Diabetes Centre, the Centre for Ethnic Health Research, NHS Leicester City Clinical Commissioning Group, the city council, sports clubs and faith groups, have come together to develop new health and wellbeing programmes tailored to the needs of Leicester's South Asian community. This includes the 'Healthy Goals' initiative to promote healthy lifestyles and help prevent type 2 diabetes. The 12 week programme includes interactive lifestyle education, covering diets, cooking methods, increasing physical activity, reducing sedentary behaviour and managing emotions. This is followed by an hour of physical activity led by coaches from Leicester City in the Community, the community arm of Leicester City Football Club.
- Early feedback highlights a positive impact for those who have engaged with the Healthy Goals initiative, with participants reporting increases in their knowledge of how to stay healthy and lifestyle changes they had made with regards to cooking methods and physical activity. Reductions in weight, waist circumference and blood pressure were also recorded amongst those who attended initial sessions of the programme, which is now being embedded as part of health and wellbeing programmes offered by local sports clubs.

By supporting people within Leicester's ethnic communities to keep active and to live well, the programme aims to help reduce their risk of developing type 2 diabetes and its complications.

## Stand More AT (SMArT) Work

- Sedentary behaviour is associated with an increased risk of chronic disease, including type 2 diabetes, and mortality (often independently of body mass index (BMI) and physical activity), poor mental health, and a lower quality of life. Office workers are one of the most sedentary populations, spending 70-85% of time at work sitting.<sup>38</sup> Employers can therefore play an important role in encouraging healthy lifestyle choices by reducing sedentary behaviour. However, high quality evidence as to the effectiveness of workplace interventions is often lacking, which can limit their uptake and implementation.<sup>38</sup>
- The Stand More At Work (SMArT Work) programme was designed in response to this. Leicester Diabetes Centre coordinated a cluster randomised controlled trial to test the impact of the SMArT Work intervention over the short medium and longer term in a sample of office workers working within the NHS in the Midlands. By targeting NHS staff, the scheme also focused on a workforce where sick leave has significant implications.
- The programme has been through seven years of development and showed positive results for improved job performance, increased work engagement, reduction in musculoskeletal issues, and improved quality of life. A cost-benefit analysis of SMArT Work showed a potential return on investment of £3 on every £1 spent as a result of increased productivity, resulting in a net-saving of £1,770.32 per employee.<sup>39</sup>

The SMArT programme demonstrates that simple prevention initiatives can be introduced alongside local employers and have positive implications for productivity, satisfaction, and employee health.

## Empowering Communities

- Another initiative supported through the Cities Changing Diabetes programme in Leicester is the training of new community champions to be health and wellbeing advocates to their peers, focusing on increasing awareness of and preventing type 2 diabetes. Following work to share knowledge and insights with colleagues in Houston, Texas, about how to engage ethnic minority communities most at risk of developing type 2 diabetes, the team in Leicester have sought to empower faith communities as a source of information trusted by local communities.
- To date, 27 volunteers representing local faith communities, employers and community groups have completed their training delivered by colleagues at Leicester Diabetes Centre. The champions are now working within their communities to disseminate health messages and provide type 2 diabetes risk screening, using the Leicester Diabetes Risk Score (which has been adopted by Diabetes UK and recommended by the National Institute for Health and Care Excellence).<sup>40</sup> The community champions then signpost those at high risk to appropriate help and support.
- With the support of the local health service, there are plans to eventually recruit up to 50 community champions in Leicester. A local network to support the champions in their work has also been established to support the sustainability of the initiative and to explore how the community champions could potentially support other health and wellbeing initiatives within the city.



By working with champions to support outreach which suits their community, initiatives like this have the potential to reach more of those at risk of developing type 2 diabetes.

*“Not only have we engaged with local communities to design and develop the training to ensure community champions have the skills and tools they need, we are also supporting them to deliver the programme in a way which suits their community. We hope this model of community empowerment will increase the awareness of type 2 diabetes, the risk factors associated with it and help communities understand where they can go for further help and support.”*

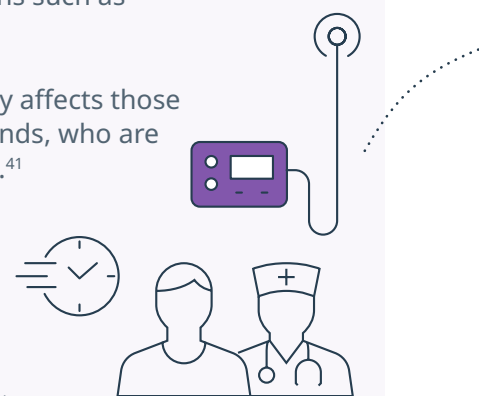
Leicester Cities Changing Diabetes Project manager  
**Dr Sophie O’Connell**

### 3. Treatment and care

Given one in every 14 people in the UK is now living with diabetes, it is of growing importance to the public, the NHS, and the economy that people with diabetes are supported to live well with their condition.<sup>6</sup> The risk of complications can be reduced for people living with diabetes through timely interventions to control blood glucose, cholesterol and blood pressure.<sup>18</sup> However, the current reality is that diabetes is too often leading to life-changing or life threatening health complications such as amputation, stroke and heart attack.<sup>6</sup>

Type 2 diabetes, the most prevalent form of diabetes, disproportionately affects those living in areas of deprivation and people from ethnic minority backgrounds, who are already at increased risk of worse health and socio-economic outcomes.<sup>41</sup>

Improving care and outcomes for everyone living with diabetes could play a significant role in improving their quality of life and life chances.



#### Risk Stratification

- The huge acute and emergency medicine effort to support people with COVID-19 has had a major knock-on impact on the delivery of day-to-day clinical care for long-term conditions like diabetes. Challenges to the delivery of diabetes services during this period include a reduction in medical and nursing staff, limitations placed by social distancing on physical clinical space, and balancing virtual vs face-to-face care.<sup>42</sup> As the NHS continues to manage the impact of COVID-19, care must be prioritised for those at greatest risk of complications linked to their diabetes, to prevent further avoidable ill-health. However, a key barrier to supporting those most in need is identifying them in the first place.
- In Leicester, services have successfully utilised the Association of British Clinical Diabetologists' (ABCD) model for risk stratification to help identify those with diabetes most in need of a care review. The model uses multi-factorial risk profiling to split the diabetes patient population into three categories: Urgent – see within the next three months, Priority – see within the next six months, and Routine – provide them with information and resources, including guidance on what to do if any of their circumstances change.<sup>42</sup>

*“The COVID-19 pandemic has only served to underline the importance of targeted and adaptive models of care, and risk stratification models are essential tools as health systems recover and rebuild from the additional pressures experienced during the outbreak, helping to identify those patients with the most pressing clinical needs so that they can receive timely care.”*

University of Leicester  
**Professor Pratik Choudhary**

| Risk stratification enables delivery of care which is adaptive and responsive to need.



## Multidisciplinary clinical team approach to supporting people with type 1 diabetes in the community

- Across Leicester, Leicestershire and Rutland there are approximately 5000 people with type 1 diabetes, about half of whom are seen in specialist clinics by the multidisciplinary team (MDT) at University Hospitals of Leicester NHS Trust.<sup>36</sup> The other half are managed by their primary care physician, supported by community diabetes nurses. This second group of patients have therefore not previously been able to access the support and expertise of the specialist MDT. Many of these are the most vulnerable, who may face challenges travelling to hospital for appointments outside of their immediate vicinity, or difficulties living with multiple comorbidities or mental health issues that can make the management of type 1 diabetes even more challenging.
- In response, University Hospitals of Leicester NHS Trust have extended the MDT approach into the community to improve access to specialist support and expertise for people living with type 1 diabetes. In practice, this involves connecting diabetes specialists from the Trust with colleagues working in primary care to discuss complex cases and understand how they can be best supported in the community.



A multidisciplinary approach means that clinical teams have access to a wide range of clinical experts equipped to provide the most appropriate care for each patient with diabetes, as well as access to the latest research information to help inform care through the new clinical research network for type 1 diabetes that has been established in the Midlands.

*“The new model we have been developing will help provide extra support to the many people with type 1 diabetes who are looked after in primary care, ensuring they are able to benefit from the skills and expertise of a specialist multi-disciplinary team. Through this joined-up approach to care, linking diabetes specialists working at the local hospital with those working in the community to ensure people are able to receive the clinical support they need, we hope to achieve more consistent access to technology and education for people with type 1 diabetes, which can help them in managing their condition, and to enhance the skills of healthcare professionals in primary care so that they have increasing expertise in caring for people with diabetes.”*

University of Leicester  
**Professor Pratik Choudhary**

## Joining up clinical systems across care settings

- People living with diabetes can have many separate interactions with the healthcare system across a number of clinical settings. This can lead to fragmentation of care and wastages across the system, as healthcare providers often use letters to share the outcome of each patient consultation with each other. It can also lead to the person with diabetes experiencing “story telling fatigue”, which negatively impacts on patient experience and results in less opportunity to advance the discussion between patient and clinician during consultations.
- In Derby and in Leicester, GP practices and other providers delivering diabetes care all use the SystmOne clinical system. It enables clinical teams across primary, community and secondary care to communicate in real time and access all the information required to inform clinical decision making.
- SystmOne confers a number of efficiencies across primary, secondary and community care. The team in the acute trust no longer have to dictate letters and post them to the GP practice, which previously had to acknowledge these letters and scan them into their patient notes. Instead, there is a far more seamless system now in place. And for the person with diabetes there is improved co-ordination of their treatment, less story telling fatigue that comes with multiple appointments, and more opportunities to be actively involved in their care.
- Colleagues from the Midlands have subsequently been able to share the approach they have taken with healthcare professionals beyond the region and at a national level, sharing insights about how they have been able to harmonise clinical data and processes for the care of people living with type 1 and type 2 diabetes across different parts of the healthcare system.



By establishing an interconnected clinical information system, there is the opportunity for people living with diabetes to experience improved coordination in their treatment and care.

## Structured and tailored information and education for people living with diabetes

- Most people with diabetes only have contact with a healthcare professional for a few hours per year. The rest of the time they care for and manage their diabetes themselves. Through good self-management of their condition, people with diabetes can improve their quality of life and potentially reduce their risk of developing complications. It can also help to prevent hospital admissions and reduce lengths of stay if they do need to go in to hospital. The provision of structured and tailored information and education is important in enabling good self-management. However, some people can face challenges accessing this support due to language, cultural or religious barriers.
- The Centre for Ethnic Health Research in the East Midlands works to address these and other health-related inequalities through the development of tailored information and resources for different communities. For example, the Centre has produced and translated a package of education resources on A Safer Ramadan. The programme was created to increase awareness and understanding among healthcare professionals, while also empowering members of the Muslim community to better manage their type 2 diabetes during the religious festival and to encourage open conversations about the risks and alternatives to fasting.
- Delivery of the programme to the Muslim community by people from within the community has helped to create a primary care referral pathway for healthcare professionals, expand community awareness and promote self-management to reduce the risks of hypoglycaemia and hospitalisation. Upskilling and educating healthcare professionals on this subject has led to an increase in open conversations with the person who has diabetes and their healthcare team, which ultimately helps support safer fasting during Ramadan.<sup>43</sup>
- The Leicester Diabetes Centre has also established the Diabetes Education and Self-Management for Ongoing and Newly Diagnosed (DESMOND) Programme - a structured education programme for people with type 2 diabetes. The programme has since been adopted by 110 healthcare organisations across UK, Ireland, Australia, Qatar & Africa. Work to develop a new online version of the programme to provide additional support and information to people with type 2 diabetes during the pandemic was recognised at the Quality in Care Diabetes Awards in 2021, with the development of information and advice in different languages and tailored to the needs of different communities highlighted as a particular benefit of the virtual programme. Over 22,000 people have made use of the virtual myDESMOND education resource to date, with the majority of users reporting that they understand their diabetes and how to manage it better as a result.



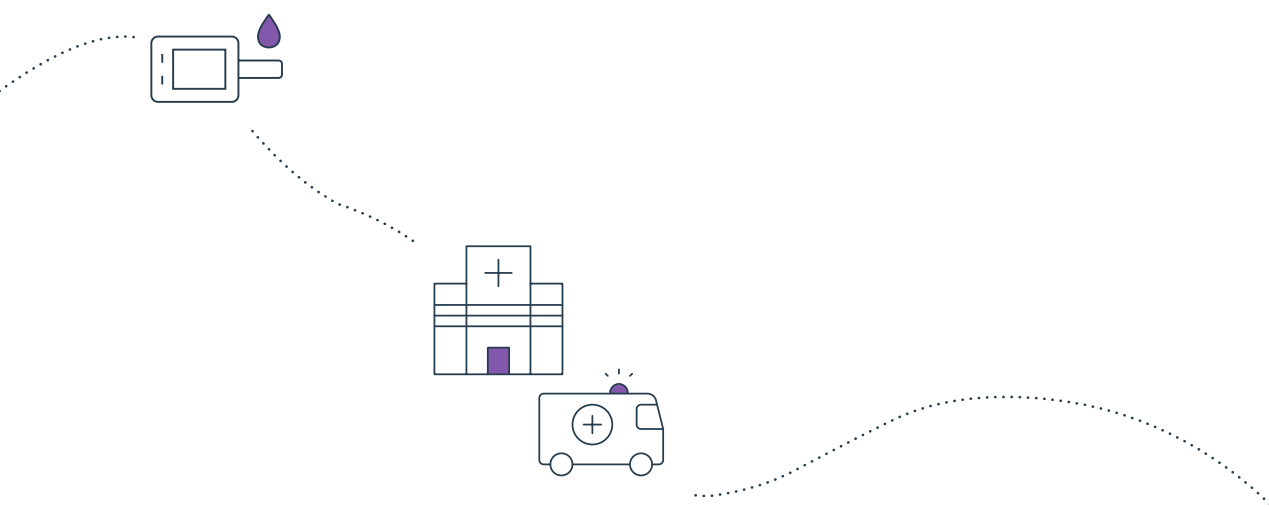
Supporting people living with diabetes through structured and tailored information can make self-management easier.

## Hypos Can Strike Twice

- It is estimated there are up to 100,000 emergency call-outs annually for hypoglycaemia in the UK, costing £13.6 million per year to the NHS, with each admission to hospital costing about £1,000.<sup>44</sup> Research shows that around one in 10 people who have a severe hypo will have another one within a fortnight.<sup>44</sup> Patient education has been identified as being important for maintaining glycaemic control and preventing recurrent hypoglycaemia.
- To prevent future ambulance attendances following a hypoglycaemic event, the East Midlands Ambulance Service NHS Trust have been issuing a patient information booklet, Hypos Can Strike Twice, alongside advice on accessing follow-up care by GPs or specialised diabetes teams.
- Research carried out by National Institute for Health Research Applied Research Collaboration East Midlands, in collaboration with the East Midlands Ambulance Service NHS Trust, shows the Hypos Can Strike Twice intervention had a positive impact. The study of 4,825 patients experiencing hypoglycaemic events attended by the ambulance service over the course of two years indicated a significant decrease in repeat attendances for hypoglycaemia, compared to the pre-intervention trend.<sup>44</sup> The Hypos Can Strike Twice booklets cost around £3.70 to issue, including staff time using it, compared to an ambulance attendance costing up to £257.<sup>44</sup>



The resource has also been shown to provide a significant improvement in the information, advice and treatment given for hypoglycaemia delivered by ambulance staff.



# The Diabetes Blueprint

Thinking together as a region is essential for improving diabetes treatment and care, and for reducing wider societal impacts.

Our work together has helped us to identify, frame and reflect on the specific issues facing our region. We are only at the start of our journey, and there is a great deal more we can learn together across our health and business communities, to help support improved health for our population.

Highlighting some of the initiatives being developed across the Midlands has allowed local partners to learn together and to consider what more could be done to support this and other regions in efforts to lower the rates of diabetes in local populations.

These recommendations and reflections form this Diabetes Blueprint, which will help to guide the next phase of our thinking in the Midlands and beyond.

## Clinical research recommendations

1

Regional research networks can create important frameworks for implementing clinical research and using the insights from this to inform the development of clinical best practice. Such networks could help support the Government's new ambitions to embed clinical research at the heart of patient care across the NHS and make it as easy and economic as possible to run innovative, efficient, and high-quality clinical research across the UK.<sup>45,46</sup>

2

Understanding the unique character of a region and its specific health challenges should inform local research priorities, to increase understanding of local population needs.

3

Investing in regional and local research centres provides the potential to allow patient populations to access the latest medical advances at the earliest opportunity and to ensure an inclusive approach to research which could help address the needs of under-served communities and health inequalities in the provision of healthcare, through diversifying participation in innovative studies and trials.

4

Research to improve understanding of diabetes and obesity, as chronic conditions with growing prevalence which affect large sections of the UK population, should be prioritised to support improvements to care and services, to help reduce the impact on individuals and the NHS of associated health complications and to support resilience against any future pandemics in light of the impact COVID-19 had on health outcomes for people living with diabetes and obesity.



## Prevention recommendations

5

Identifying specific risk factors within local populations that are potentially driving increases in rates of type 2 diabetes provides regional partners with opportunities to develop targeted interventions to help address these risks.

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6

Mobilising community partners to help tailor interventions to populations most at risk of developing type 2 diabetes and to drive engagement with these communities could help achieve greater impact in efforts to address health inequalities associated with type 2 diabetes. This has the potential to be most effective when collaboration incorporates all sectors, for example community centres, sports clubs, faith groups and local councils, working alongside multi-disciplinary clinical teams.

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7

Engaging with and educating major employers in a region on evidence-based interventions that can help keep their workforce healthy and productive offers the potential to work with a broader range of partners to improve population health and to help prevent type 2 diabetes.

## Treatment and care recommendations

8

Identifying those individuals or groups within a population most at risk of complications from diabetes, or unequal access to care and support, is critical to reduce the impact of diabetes on individuals, the NHS and economic resilience.

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9

Developing robust processes to make sure healthcare professionals from a range of clinical disciplines are able to support the care of people living with diabetes and to make shared decisions with patients about their care is important to ensure the right care at the right time for individuals and to improve health outcomes for people with diabetes.

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10

Working with community partners to ensure that patient information and education is appropriate and accessible for people of minority ethnic backgrounds and other populations at particular risk of type 2 diabetes, such as those from more deprived communities, could help empower people in managing their health.

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11

Identifying and seizing key moments of contact with NHS services to educate people living with diabetes on effective self-management could help support improved health outcomes.

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12

Integrated Care Systems provide a new opportunity to join up pathways of care for people living with type 2 diabetes and obesity, including by integrating weight management services with other aspects of treatment and care, like mental health support, through partnership and coordinated commissioning. It is particularly important to establish a holistic approach to the increased prevalence of early-onset type 2 diabetes in children and young people. Integrated Care Systems also have a vital role to play in embedding clinical research within the delivery of NHS care, to ensure those at risk of developing type 2 diabetes and everyone living with any form of diabetes is able to benefit from care based on the latest clinical research findings and evidence.

# What next for the Midlands?

Though there is excellent and exciting work happening in the Midlands, there is more that can be done to help improve health outcomes for people living with diabetes, or at risk of developing type 2 diabetes across the region. Many of the projects outlined in this report are in their infancy, and it will be essential to monitor outcomes and adjust to ensure these initiatives can deliver on their potential.

There is also the potential for collaboration to be increasingly strengthened, building on the work of the Midlands Health Alliance as it seeks to support improvements in care and outcomes across the region. Researchers and clinical teams should be empowered to develop existing projects and to explore opportunities to scale these up to help support the spread of best practice across the region, as well as trying new approaches. Alongside activity to reinforce the importance of this work for wellbeing and prosperity in the Midlands, there is the opportunity for the experience and insights from the region to support other regions across the country as they seek to address the impact of diabetes in their own areas.

Midlands representatives are also well placed to highlight to the Government the need for increased investment in improving health outcomes, including in measures to improve our understanding of diabetes through clinical research and in translating these important insights in to the delivery of front-line care. Diabetes must be a national priority. Its impacts go far beyond individuals managing their own condition, and businesses and health systems should not be expected to shoulder this burden. Work can be done to support people with diabetes to access new and innovative support to improve their wellbeing and reduce the potential health consequences resulting from their condition.

If regions across the UK can be empowered and inspired to invest in health improvement programmes using the blueprint laid out in this report, the transformational possibilities for diabetes care and treatment are significant, and this key challenge to achieving improved economic strength can be addressed.



If you would like further information about the findings and case studies in this report, you can get in touch with the Midlands Health Alliance at [MHA@uhl-tr.nhs.uk](mailto:MHA@uhl-tr.nhs.uk) or Novo Nordisk UK at [ukcorporateaffairs@novonordisk.com](mailto:ukcorporateaffairs@novonordisk.com)

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### **About the Midlands Health Alliance**

The Midlands Health Alliance (MHA) is working to support the world-leading health research infrastructure in the Midlands, to ensure delivery of high quality clinical biomedical research and to connect industry experts with investigators within the NHS to develop collaborative opportunities to address key health challenges.

### **About the Midlands Engine**

The Midlands Engine partnership brings together public sector partners and businesses to complement the activity of local and combined authorities, local enterprise partnerships, universities, businesses and others, with a focus on increasing productive economic growth and improving quality of life for communities in every part of the region.

In recognition of the fundamental connection between health and economy, the Midlands Engine partnership has worked closely with industry, academic, health and public sector partners to establish the Midlands Engine Health programme, to help champion and expand the region's world-leading capabilities in health, medical technologies and life sciences.

### **About Novo Nordisk**

Novo Nordisk is a global healthcare company with over 95 years of innovation and leadership in diabetes care. Our purpose is to defeat diabetes, obesity, rare blood and endocrine disorders. We do so by pioneering scientific breakthroughs, expanding access to our medicines and working to prevent and ultimately cure disease.

# References

- 1 NHS Digital, Quality and Outcomes Framework 2019-20: Prevalence, achievement and personalised care adjustments, Region and National level, Table 15. 2020. Available from: <https://files.digital.nhs.uk/32/72D4B7/qof-1920-prev-ach-pca-reg-nat.xlsx> [Accessed September 2021]
- 2 Diabetes UK Factsheet, Available from: <https://www.diabetes.org.uk/guide-to-diabetes/complications> [Accessed September 2021]
- 3 Diabetes Research and Wellness Foundation, Leicester celebrates 70 years of pioneering diabetes care. 2015. Available from: <https://www.drwf.org.uk/news-and-events/news/leicester-celebrates-70-years-pioneering-diabetes-care> [Accessed November 2021]
- 4 E Barron et al, Associations of Type 1 and Type 2 diabetes and COVID-19 related mortality in England: a whole population study; *Lancet Diabetes Endocrinology*. 2020; 8(10):p. 813-822.
- 5 Public Health England, Understanding the impact of COVID-19 on BAME groups. 2020. Available from: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/892376/COVID\\_stakeholder\\_engagement\\_synthesis\\_beyond\\_the\\_data.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/892376/COVID_stakeholder_engagement_synthesis_beyond_the_data.pdf) [Accessed November 2021]
- 6 Diabetes UK 2021 Diabetes Can't Wait. Available at: [https://diabetes-resources-production.s3.eu-west-1.amazonaws.com/resources-s3/public/2021-07/Diabetes%20is%20Serious%20Report%20Final\\_0.pdf](https://diabetes-resources-production.s3.eu-west-1.amazonaws.com/resources-s3/public/2021-07/Diabetes%20is%20Serious%20Report%20Final_0.pdf) [Accessed November 2021]
- 7 Diabetes UK, Type 1 Diabetes. 2021. Available at: <https://www.diabetes.org.uk/type-1-diabetes> [Accessed November 2021]
- 8 Diabetes UK, Type 2 Diabetes. 2021. Available at: <https://www.diabetes.org.uk/type-2-diabetes> [Accessed November 2021]
- 9 NHS Digital, Quality and Outcomes Framework 2019-20: Prevalence, achievement and personalised care adjustments, Region and National level, Table 15. 2020. Available from: <https://files.digital.nhs.uk/32/72D4B7/qof-1920-prev-ach-pca-reg-nat.xlsx> [Accessed November 2021]
- 10 NHS Digital, National Diabetes Audit 2019-20 Interactive report for England, Clinical Commissioning Groups and GP practices. 2020. Available from: <https://files.digital.nhs.uk/6E/9B23F0/National%20Diabetes%20Audit%202019-20%20Data%20Release%2C%20Interactive%20Report%20England.xlsx> [Accessed November 2021]
- 11 Public Health England, Obesity Profile. 2021. Available from: <https://fingertips.phe.org.uk/profile/national-child-measurement-programme/data#page/0/gid/1938133368/ati/6/cid/4/tbm/1> [Accessed November 2021]
- 12 Ntuk, Uduakobong, et al, Ethnic-specific obesity cutoffs for diabetes risk: Cross-sectional study of 490,288 UK Biobank Participants; *Diabetes Care*. 2014; 37, p. 2500-2507
- 13 Public Health England, Adult obesity and type 2 diabetes. 2014. Available from: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/338934/Adult\\_obesity\\_and\\_type\\_2\\_diabetes\\_.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/338934/Adult_obesity_and_type_2_diabetes_.pdf) [Accessed November 2021]
- 14 Office for National Statistics, Population Profiles for Local Authorities and Regions in England. 2021. Available from: <https://www.ons.gov.uk/visualisations/dvc1071/profiles/datadownload.xlsx> [Accessed November 2021]
- 15 Connolly V et al, Diabetes prevalence and socioeconomic status: a population based study showing increased prevalence of type 2 diabetes mellitus in deprived areas *Journal of Epidemiology & Community Health*. 2000; 54:173-177.
- 16 Midlands Engine Economic Observatory 2020 State of the Region. Available at: <https://www.midlandsengine.org/wp-content/uploads/Midlands-Engine-State-of-the-Region-Oct-2020-final.pdf> [Accessed November 2021]
- 17 NHS Digital, National Diabetes Audit 2017-18, Report 2b Complications and Mortality: Tables and Charts. Available from: <https://files.digital.nhs.uk/75/72BFA9/National%20Diabetes%20Audit%2C%202017-18%2C%20Report%202b%20Supporting%20Information.xlsx> [Accessed November 2021]
- 18 M J Keng et al, Impact of achieving primary care targets in Type 2 diabetes on health outcomes and healthcare costs; *Diabetes, Obesity and Metabolism*. 2019; 21(11): p. 2405- 2412.
- 19 S Bain et al, Evaluating the burden of poor glycaemic control associated with therapeutic inertia in patients with type 2 diabetes in the UK; *Journal of Medical Economics*. 2020; 23(1): p.98-105; Available from: <https://doi.org/10.1080/13696998.2019.1645018>
- 20 A Ruston et al, Diabetes in the workplace - diabetic's perceptions and experiences of managing their disease at work: a qualitative study, *BMC Public Health*. 2013; 13:386.
- 21 J Rumball-Smith et al, Diabetes Associated With Early Labor-Force Exit: A Comparison Of Sixteen High-income Countries, *Health Affairs*. 2014; 33(1): p. 110-115
- 22 DOF 2021 Midlands Blueprint - Supporting Information
- 23 Sumit R. Majumdar et al, Better Outcomes for Patients Treated at Hospitals That Participate in Clinical Trials. *Arch Intern Med*. 2008; 168(6):657-662.
- 24 BMA 2017 Health at a Price. Available from: <https://www.bma.org.uk/media/2084/health-at-a-price-2017.pdf> [Accessed November 2021]
- 25 Health Foundation, What the quality of work means for our health. 2020. Available from: <https://www.health.org.uk/publications/long-reads/the-quality-of-work-and-what-it-means-for-health> [Accessed November 2021]
- 26 Ekezie W et al, Patient and public involvement for ethnic minority research: an urgent need for improvement. *Journal of the Royal Society of Medicine*. 2021; 114(7):347-350.
- 27 Antza, C et al, The impact of sleep disorders on microvascular complications in patients with type 2 diabetes (SLEEP T2D). Pilot and Feasibility Studies. 2021; 7(1):80
- 28 Diabetes UK, Diabetes Risk Factors. Available from: <https://www.diabetes.org.uk/preventing-type-2-diabetes/diabetes-risk-factors> [Accessed November 2021]

- 29 NHS Digital, Young People with Type 2 Diabetes, 2019-20. Available from: <https://digital.nhs.uk/data-and-information/publications/statistical/national-diabetes-audit/young-people-with-type-2-diabetes-2019--20> [Accessed November 2021]
- 30 University of Leicester, £2.6 million to create new approach to care for the under 40s with type 2 diabetes. 2021. Available from: <https://le.ac.uk/news/2021/june/m3-diabetes> [Accessed November 2021]
- 31 NIHR, Funding and Awards: Type 2 Diabetes (T2D) in 16 40 year olds: A Multifactorial Management Intervention to Address Multimorbidity in Early-Onset T2D in Adults (The M3 Research Programme). Available from: <https://fundingawards.nihr.ac.uk/award/NIHR201165> [Accessed November 2021]
- 32 Diabetes UK, Diabetes Diagnoses Double in the Last 15 Years. 2021. Available from: [https://www.diabetes.org.uk/about\\_us/news/diabetes-diagnoses-doubled-prevalence-2021](https://www.diabetes.org.uk/about_us/news/diabetes-diagnoses-doubled-prevalence-2021) [Accessed November 2021]
- 33 NHS England, NHS Diabetes Prevention Programme. Available: <https://www.england.nhs.uk/diabetes/diabetes-prevention/> [Accessed November 2021]
- 34 Wilmot E et al, Sedentary time in adults and the association with diabetes, cardiovascular disease and death: systematic review and meta-analysis. *Diabetologia*. 2012; 55:2895–2905
- 35 NHS Digital, National Diabetes Audit - 2012-2013: Report 1, Care Processes and Treatment Targets. 2014. Available from: <https://files.digital.nhs.uk/publicationimport/pub14xxx/pub14970/nati-diab-audit-12-13-rep1-sup-ccg-lhb-dat-tab.xlsx> [Accessed November 2021]
- 36 NHS Digital, National Diabetes Audit, 2020-21 Quarterly Report. 2021. Available from: <https://files.digital.nhs.uk/48/058087/National%20Diabetes%20Audit%202020-21%20Quarterly%20Report%20January%202020%20to%20March%202021%20v2.xlsx> [Accessed November 2021]
- 37 NHS England 2019 NHS Long Term Plan. Available from: <https://www.longtermplan.nhs.uk/wp-content/uploads/2019/08/nhs-long-term-plan-version-1.2.pdf> [Accessed November 2021]
- 38 Edwardson C et al, Effectiveness of the Stand More AT (SMaRT) Work intervention: cluster randomised controlled trial. *BMJ*. 2018; 363:k3870
- 39 University of Leicester, The Science Behind Sitting. 2020. Available from: <https://le.ac.uk/research/stories/human-health/sitting-science> [Accessed November 2021]
- 40 Leicester Diabetes Centre, Major diabetes milestone for Leicester researchers. 2016. Available from: <https://www.leicesterdiabetescentre.org.uk/news-blog/2019/6/11/major-diabetes-milestone-for-leicester-researchers> [Accessed November 2021]
- 41 Ministry of Housing, Communities and Local Government, People living in deprived neighbourhoods. 2020. Available at: <https://www.ethnicity-facts-figures.service.gov.uk/uk-population-by-ethnicity/demographics/people-living-in-deprived-neighbourhoods/latest#download-the-data>. [Accessed November 2021]
- 42 Nagi D et al, ABCD position statement on risk stratification of adult patients with diabetes during COVID-19 pandemic. *The British Journal of Diabetes*. 2021; 21(1):123-131
- 43 The Centre for Ethnic Health Research, A Safer Ramadan. Available from: <https://ethnichealthresearch.org.uk/a-safer-ramadan/> [Accessed November 2021]
- 44 Diabetes Times, Campaign cuts number of 999 call outs for diabetes-related emergencies. 2021. Available from: <https://diabetestimes.co.uk/campaign-cuts-number-of-999-call-outs-for-diabetes-related-emergencies/> [Accessed November 2021]
- 45 Department of Health and Social Care (2021) Saving and Improving Lives: The Future of UK Clinical Research Delivery. Available from: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/995768/The-future-of-UK-clinical-research-delivery.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/995768/The-future-of-UK-clinical-research-delivery.pdf) [Accessed November 2021]
- 46 HM Government 2021 Life Sciences Vision. Available from: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/1013597/life-sciences-vision-2021.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1013597/life-sciences-vision-2021.pdf) [Accessed November 2021]



