

# Tackling The Challenges of Treating Diabetes

18/01/2023

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Blackpool Teaching Hospital



**Blackpool Teaching Hospitals**  
NHS Foundation Trust

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The blue circle signifies **the unity of the global diabetes community in response to the diabetes pandemic.**”

Universal blue circle  
symbol for diabetes



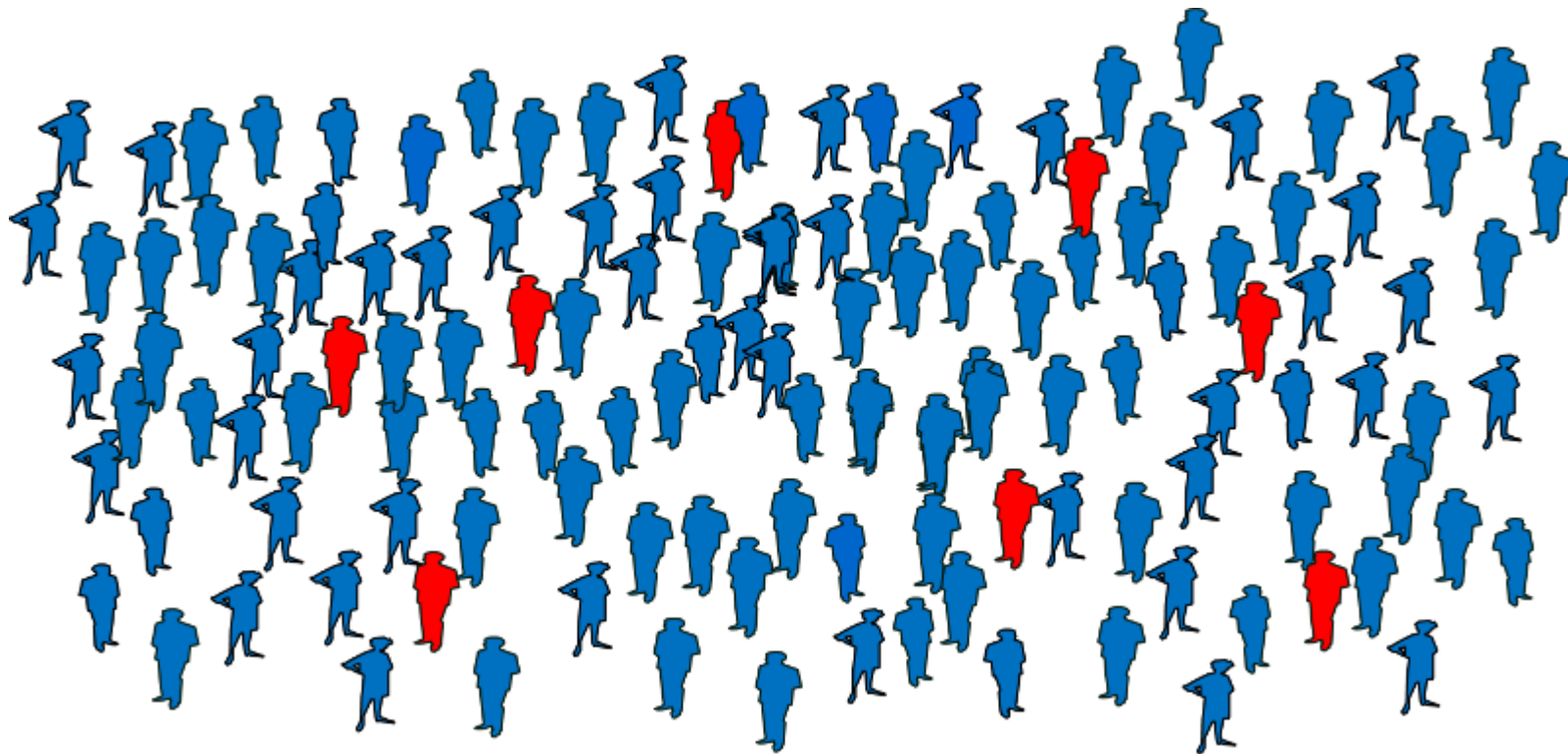
International  
Diabetes  
Federation



world diabetes day

BLUE CIRCLE FOR DIABETES

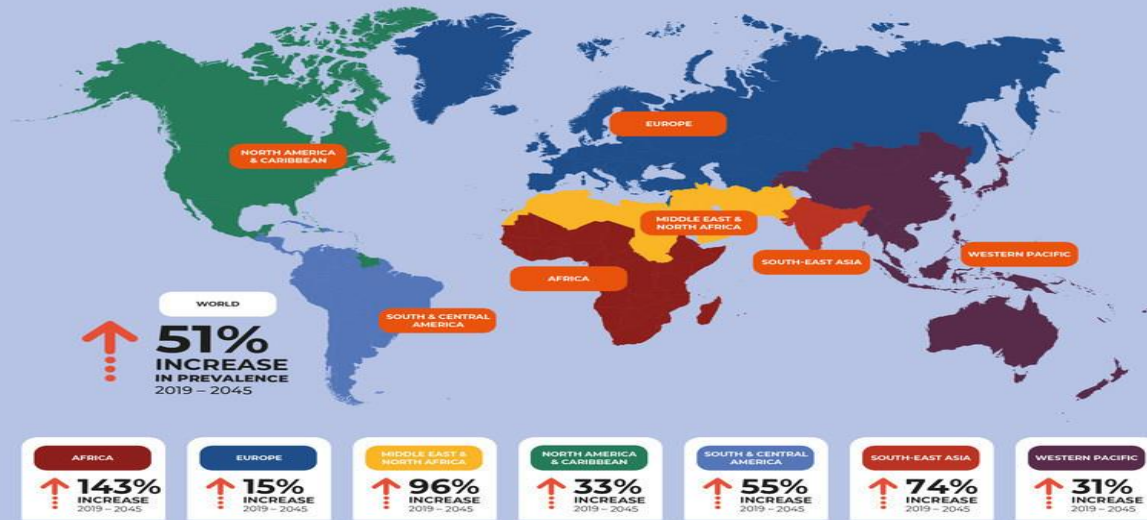
# Numbers



# THE ALARMING RISE IN DIABETES AROUND THE WORLD

The IDF Diabetes Atlas 9th Edition 2019 reveals global diabetes prevalence continues to increase. Current projections show 700 million adults will be living with diabetes by 2045.

**463**  
million  
adults are living  
with diabetes  
worldwide



Diabetes affects all age groups, regardless of geography and income. It is impacting families worldwide.

A healthy lifestyle can help prevent type 2 diabetes and early diagnosis and uninterrupted access to appropriate care can avoid or delay life-threatening complications in people with the condition.



## DIABETES: PROTECT YOUR FAMILY

View all the latest IDF Diabetes Atlas findings and learn more about what can be done to reduce the impact of diabetes at:

[www.diabetesatlas.org](http://www.diabetesatlas.org)  
#WorldDiabetesDay



**4.7 million**  
people in the UK  
have diabetes.

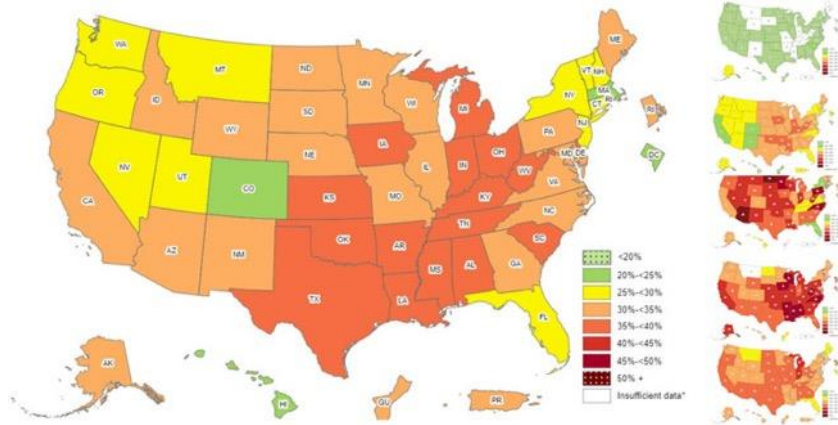


One in ten over 40s now has Type 2 diabetes, and the number of people living with diabetes in all its forms in the UK has reached 4.7 million. The number of people affected by diabetes is expected to reach 5.5 million by 2030.



**12.3 million**

people are at **increased risk**  
of Type 2 diabetes



The NEW ENGLAND JOURNAL of MEDICINE

SPECIAL ARTICLE

## Projected U.S. State-Level Prevalence of Adult Obesity and Severe Obesity

Zachary J. Ward, M.P.H., Sara N. Bleich, Ph.D., Angie L. Cradock, Sc.D.,  
 Jessica L. Barrett, M.P.H., Catherine M. Giles, M.P.H., Chasmine Flax, M.P.H.,  
 Michael W. Long, Sc.D., and Steven L. Gortmaker, Ph.D.

**By 2030    ~50% obesity    ~25% morbid obesity**

Ward ZJ *et al*; *NEJM* 2019; 381: 2440-2450

<https://www.worldobesity.org/resources/resource-library/world-obesity-atlas-2022>, Accessed 04 June,

<https://www.cdc.gov/obesity/data/prevalence-maps.html>, Accessed 04 June, 2022

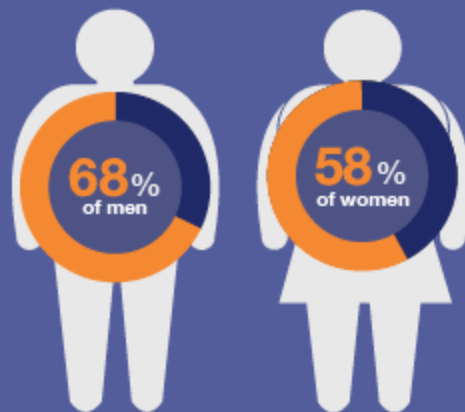
# One Billion People Globally Estimated to be Living with Obesity by 2030

Call for Global Action Plan on Obesity at World Health Assembly in May 2022

- The [World Obesity Atlas 2022](#), published by the World Obesity Federation, predicts that one billion people globally, including 1 in 5 women and 1 in 7 men, will be living with obesity by 2030.
- The findings highlight that countries will not only miss the 2025 WHO target to halt the rise in obesity at 2010 levels, but that the number of people with obesity is on course to double across the globe.
- The greatest number of people living with obesity are in low- and middle-income countries (LMICs), with numbers more than doubling across all LMICs, and tripling in low income countries, compared to 2010.

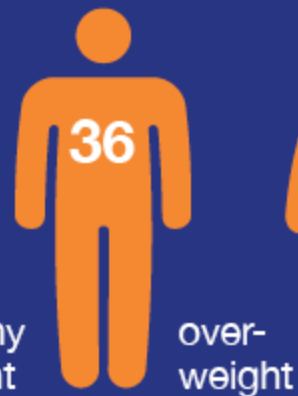


In 2015  
**63%**  
of adults in England  
were **overweight  
or obese**



In England, the prevalence of obesity  
among adults rose from 14.9% to  
26.9% between 1993 and 2015

Of every  
**100 adults**  
in England  
there are...







**28%**  
of children  
aged 2 to 15 are  
**overweight  
or obese**

Younger generations are becoming **obese at earlier ages** and staying obese into adulthood



Of every 100 4 & 5 year olds in England there are...



under weight



healthy weight



over-weight



obese

Of every 100 10 & 11 year olds in England there are...



under weight



healthy weight



over-weight



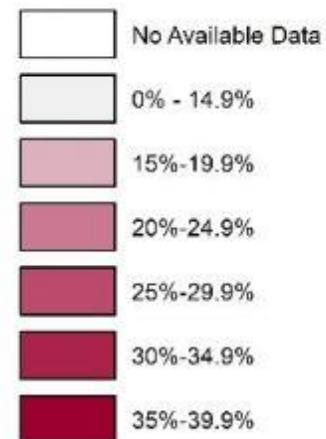
obese



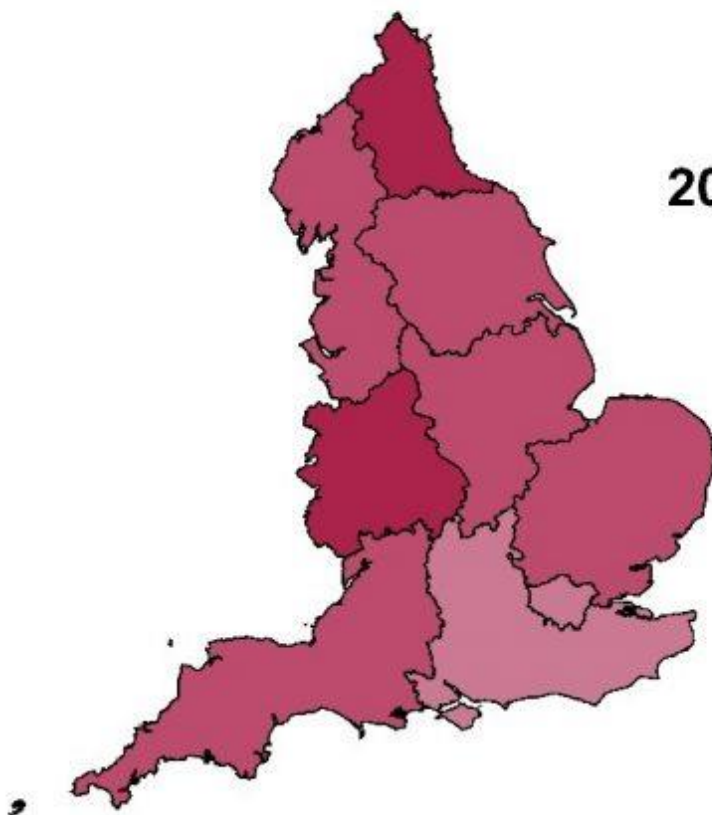
Public Health  
England

## Prevalence of obesity in adults (aged 16+)

Source: Health Survey for England

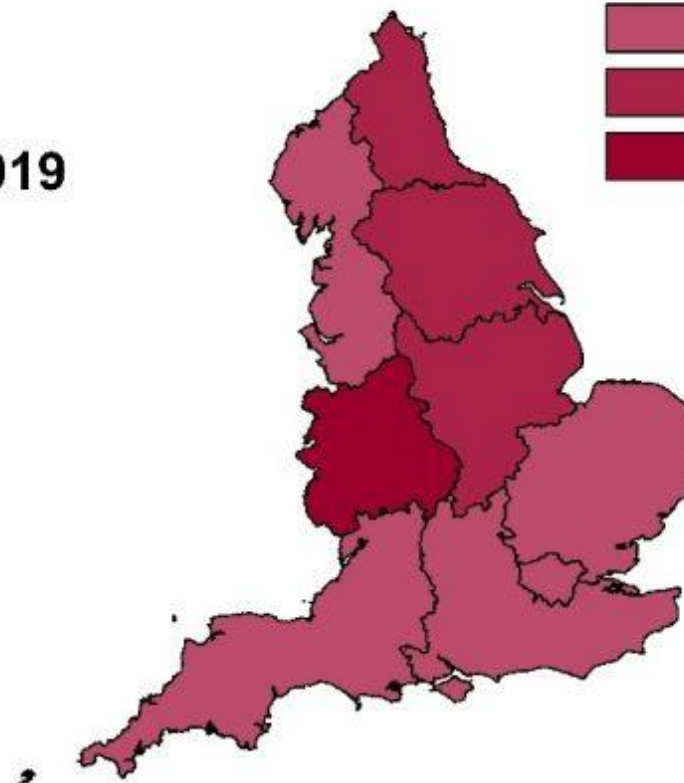


2017-2019



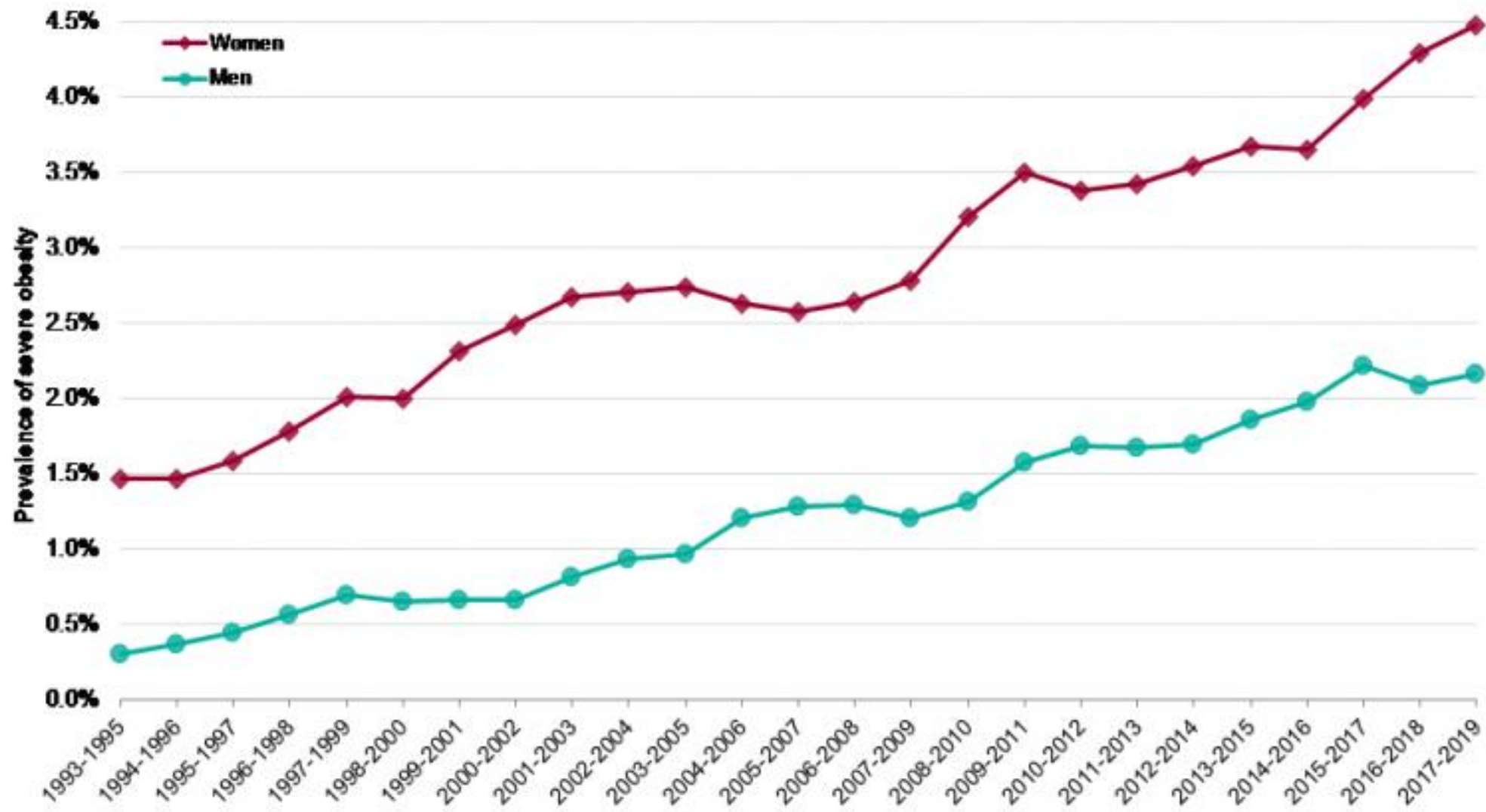
**Males**

The national prevalence rate is 27.3%  
(averaged) for this 3 year time period



**Females**

The national prevalence rate is 30.2%  
(averaged) for this 3 year time period



# Tackling The Challenges of Treating Diabetes

- In 2019/20 ,**11,752** people over the age of **17** had been identified by NHS Blackpool CCG GP practices as living with diabetes.

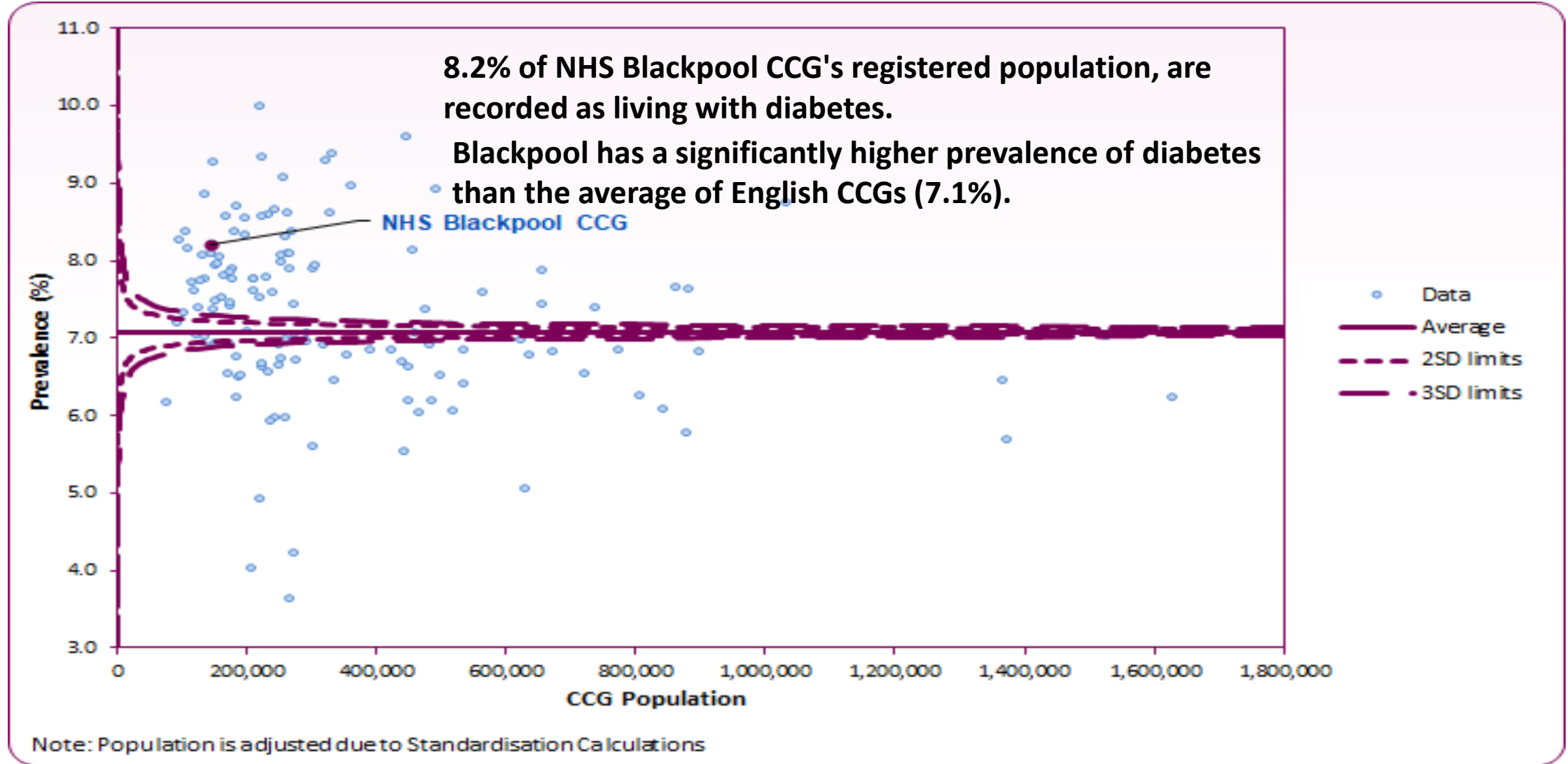
PHE, [National General Practice Profiles](#)

There are likely to be approximately 1,300 people with undiagnosed diabetes.

PHE, [\*Diabetes prevalence estimates for local populations\*](#)



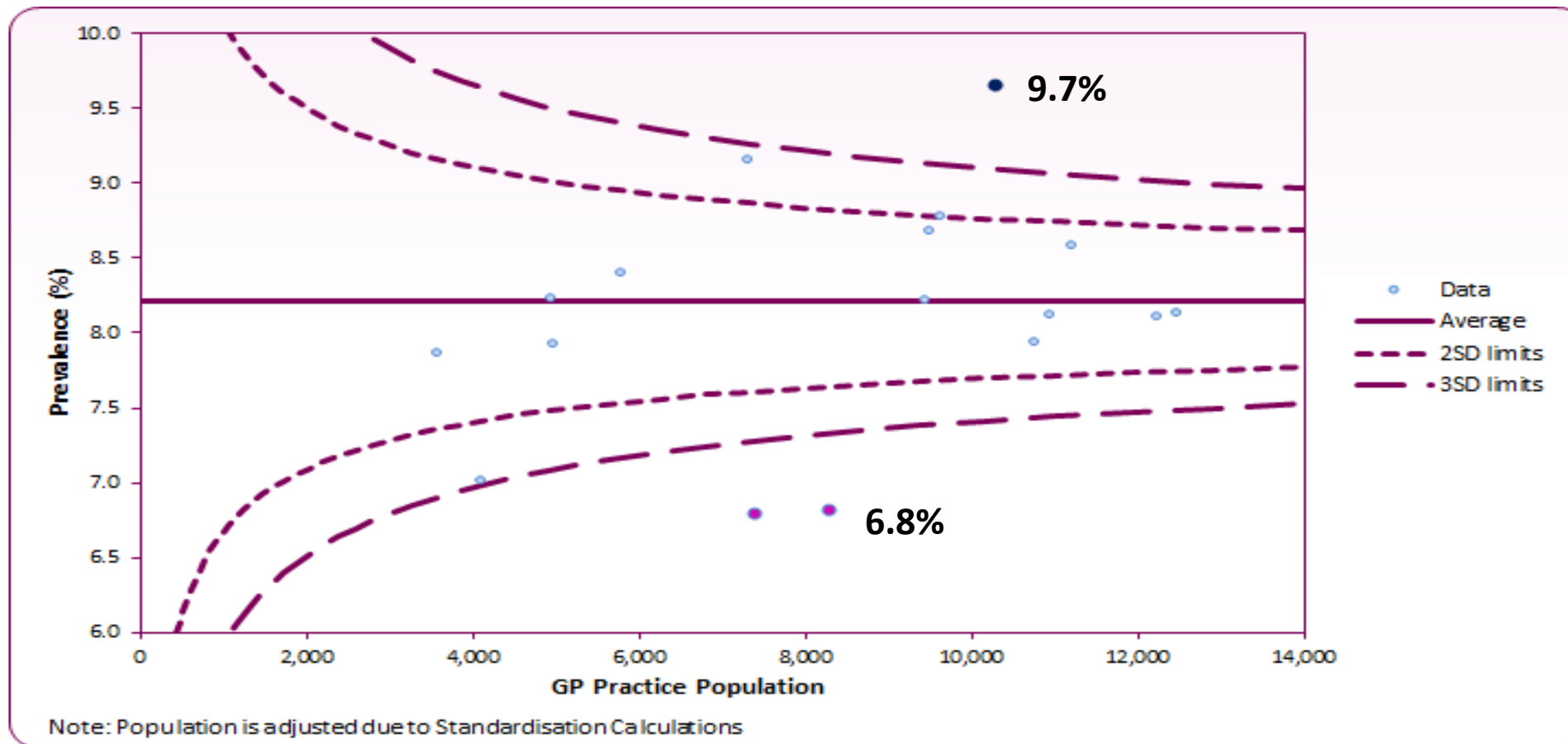
Figure 1 - Diabetes Prevalence (17+) Funnel Plot Analysis at CCG Level (2019/20 QOF)



Source: Quality Outcomes Framework (QOF)

**Figure 2** shows all the GP practices that make up NHS Blackpool CCG. There is a considerable range in recorded prevalence of diabetes at GP practices from 6.8% to 9.7%

**Figure 2 - Diabetes Prevalence (17+) Funnel Plot Analysis at GP Level (2019/20 QOF)**



Source: Quality Outcomes Framework (QOF)



# National Cardiovascular Intelligence Network

## Prevalence estimates of diabetes

<b>Published</b>	2016
<b>Produced by</b>	Public Health England
<b>Geography</b>	Local authority and whole of England
<b>Age</b>	16 years and over
<b>Sex</b>	Total
<b>Data source</b>	Health Survey for England 2012, 2013 and 2014 2014-based Subnational Population Projections, mid-2012 to mid-2037, Population Projections Unit, ONS. Crown copyright 2014. Hospital Episode Statistics (HES), 2012/13 - 2014/15, Copyright © 2016, Re-used with the permission of NHS Digital. NHS Digital is the trading name of the Health and Social Care Information Centre. All rights reserved. English indices of deprivation 2015, Department for local communities and local government

The total number of people with diabetes (diagnosed and undiagnosed) were estimated using a multivariate logistic regression model developed using Health Survey

Notes

2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2025 | 2030 | 2035



# Tackling The Challenges of Treating Diabetes

**2020**

Number

Prevalence

**England**

**4,085,165**

**8.9%**

**Blackpool**

**11,198**

**9.9%**



# THE COST OF DIABETES

REPORT

**DiABETES UK**  
CARE. CONNECT. CAMPAIGN.

CARE. CONNECT. CAMPAIGN.  
**DiABETES UK**

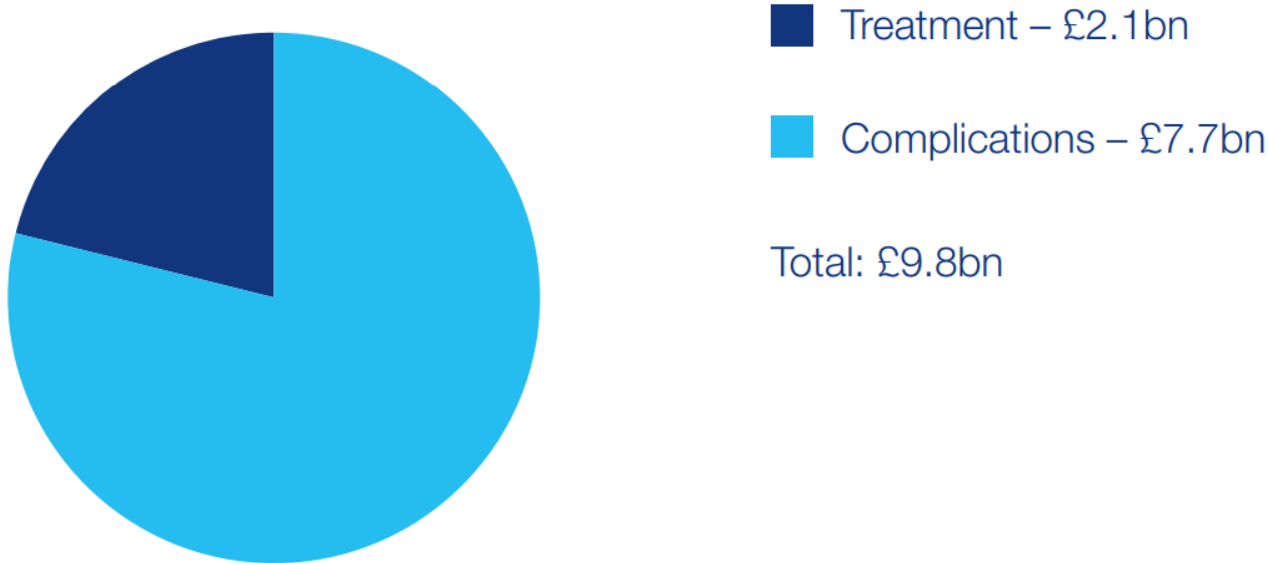
# Tackling The Challenges of Treating Diabetes

- Diabetes costs the NHS over **£1.5 million an hour**. That equates to more than **£25,000 per minute**.
- It estimates the total cost of treating diabetes and its complications is **£14 billion a year**. Put another way, that's **10 per cent of the whole NHS budget**.
- The NHS spends **£172 million** on testing supplies such as blood glucose meters, test strips and insulin pen needles.

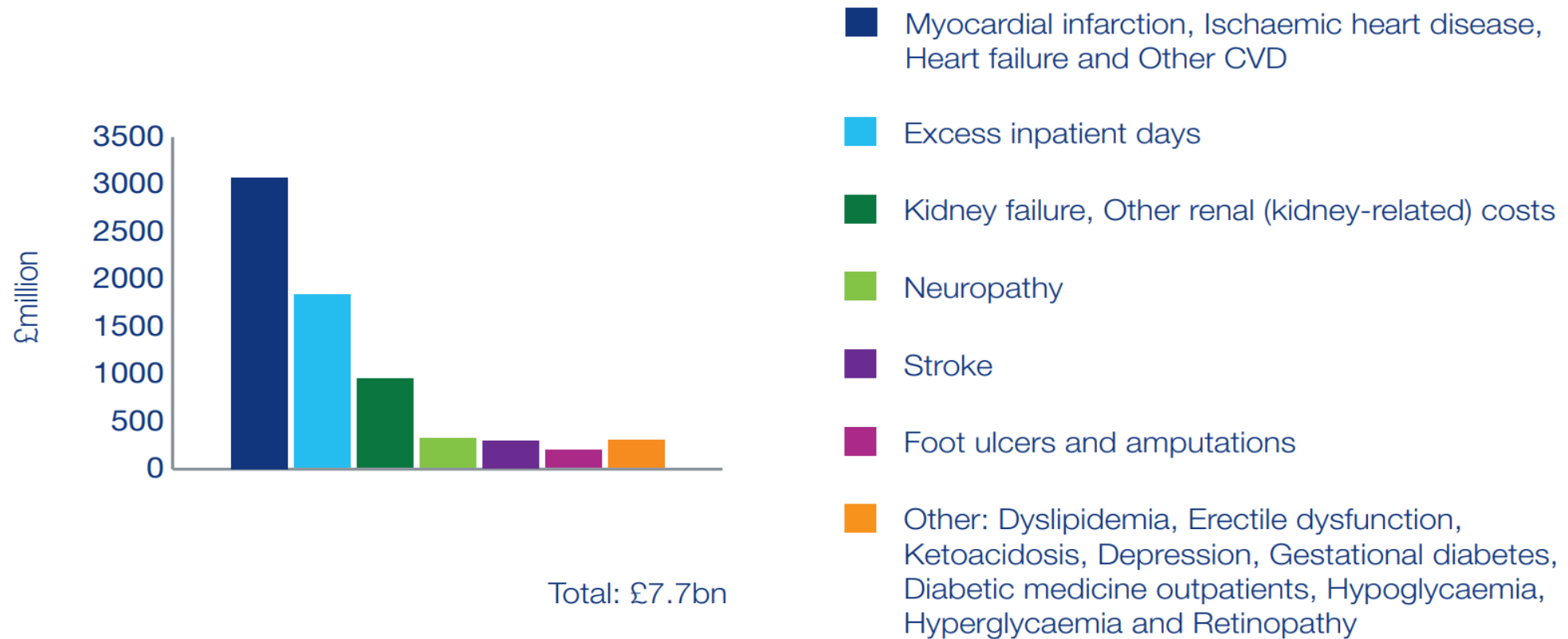


# The financial costs of diabetes

**The proportion of diabetes spending on complications and treatment**



## The costs of complications of diabetes



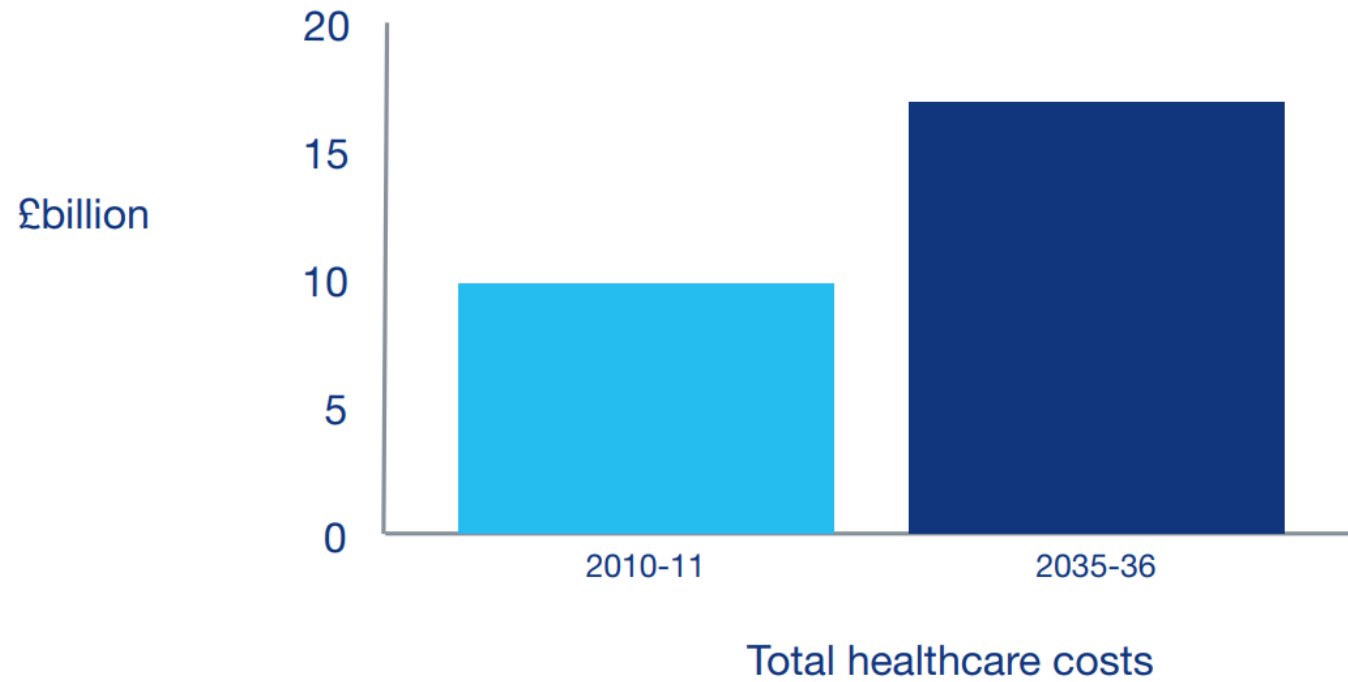
# THE RISING COST OF DIABETES

HOW THE COST OF NHS DIABETES PRESCRIPTIONS HAS CHANGED SINCE 2010



- The health service last year spent almost **£1.1 billion** on prescriptions for insulin, antidiabetic medications and treatment of hypoglycaemia – its highest diabetes bill ever

## The costs of diabetes in 2010/11 vs. the project costs for 2035/36



# The human costs



This is because of complications such as:



Amputation



Blindness



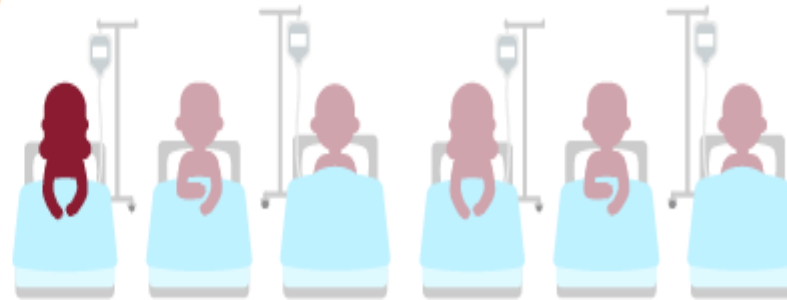
Kidney failure



Stroke

## 1 in 6

of all people in hospital have diabetes



# Diabetes – Acute Backlog Challenge through COVID-19 and beyond





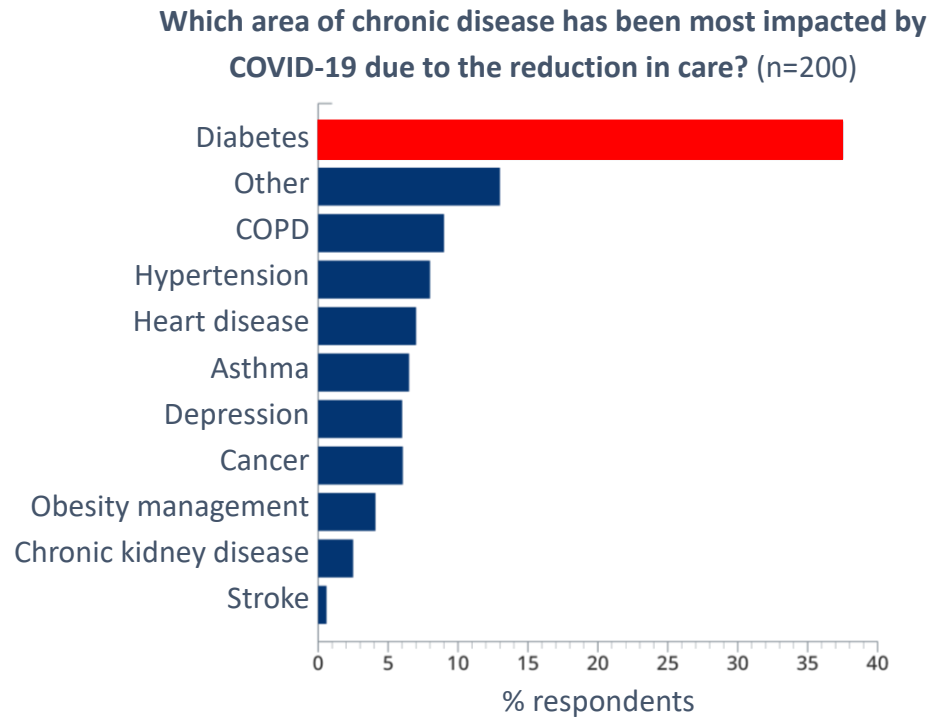
**Has COVID-19 made  
matters worse?**

# Public health crises pose both direct and indirect risks to people with diabetes<sup>1-6</sup>



1. ADA. *Diabetes Care*. 2007;30(9):2395-2398. 2. Kocurek B, et al. Information for Health Care Professionals: Switching between Insulin Products in Disaster Response Situations. ADA. 2018. 3. Dubey S, et al. *Diabetes Metab Syndr*. 2020;14(5):779-788. 4. Carr, MJ, et al. National Institute for Health Research Greater Manchester Patient Safety Translational Research Centre. Available from: <https://www.medrxiv.org/content/medrxiv/early/2020/10/27/2020.10.25.20200675.full.pdf> [Accessed May 2021] 5. National Diabetes Audit - Care Processes and Treatment Targets, Quarterly Data Release, January to September 2020. Available from <https://digital.nhs.uk/data-and-information/publications/statistical/national-diabetes-audit/care-processes-and-treatment-targets-2nd-quarter-january-september-2020-data-release> [Accessed May 2021]. 6. National Diabetes Audit- Care Processes and Treatment Targets 2019-20, Data release. Available from <https://digital.nhs.uk/data-and-information/publications/statistical/national-diabetes-audit/care-processes-and-treatment-targets-2019-20-data-release> [Accessed May 2021].

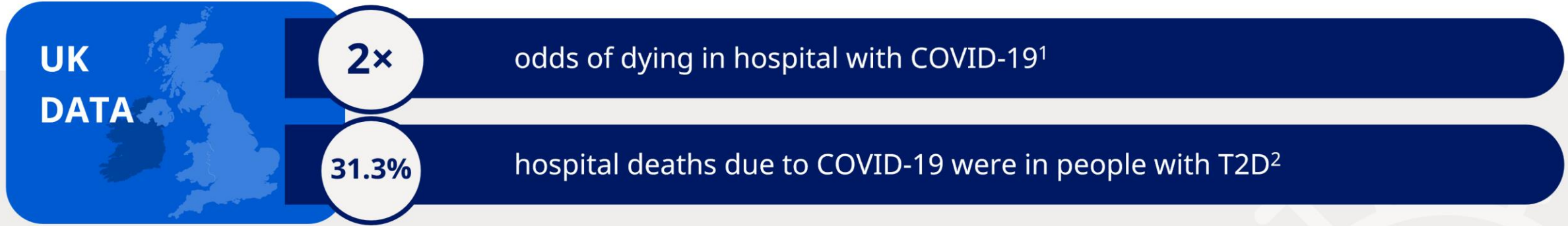
# Chronic disease and comorbidities most impacted by COVID-19 due to the reduction in care: global survey



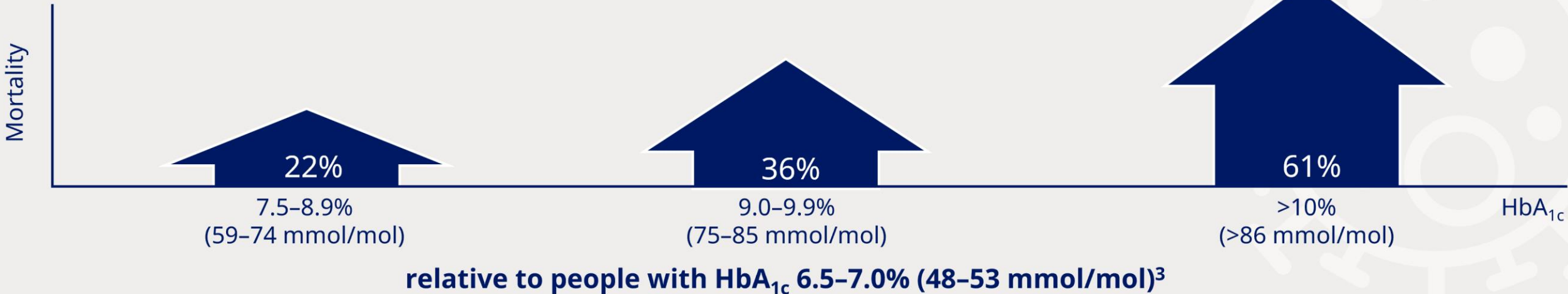
Adapted from Chudasama YV, et al. *Diab Met Syndr.* 2020;14:965-967.

Combinations with more than five responses were presented for the two most common co-occurring chronic diseases

# Uncontrolled diabetes is associated with worse COVID-19-related outcomes



COVID-19-related mortality increases by:

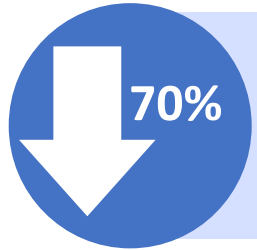


T2D, type 2 diabetes; HbA<sub>1c</sub>, glycated haemoglobin.

1. Barron E, et al. *Lancet Diabetes Endocrinol.* 2020;8:813–822. 2. Diabetes UK. NHSE statistics on coronavirus deaths in people with diabetes, 2020.

Available at: [https://www.diabetes.org.uk/about\\_us/news/coronavirus-statistics](https://www.diabetes.org.uk/about_us/news/coronavirus-statistics). [Accessed May 2021]. 3. Holman N, et al. *Lancet Diabetes Endocrinol.* 2020;8:823–833.

# Impact of COVID-19 on diabetes care



In a cohort of 790,000 people, **diagnoses for type 2 diabetes were down 70%** with more than **60,000 missed or delayed diagnosis** across the UK.<sup>1</sup>



Between March to December 2020, **overall HbA<sub>1c</sub> tests for the monitoring of people with type 2 diabetes fell by 63-69%**.<sup>1</sup>



The number of people in England receiving all 8 care processes **decreased from 58.5% to 19.2%** for the complete 2019-2020 year compared to the first three quarters (Jan-Sep) 2020 respectively.<sup>2,3</sup>

## The challenge now:

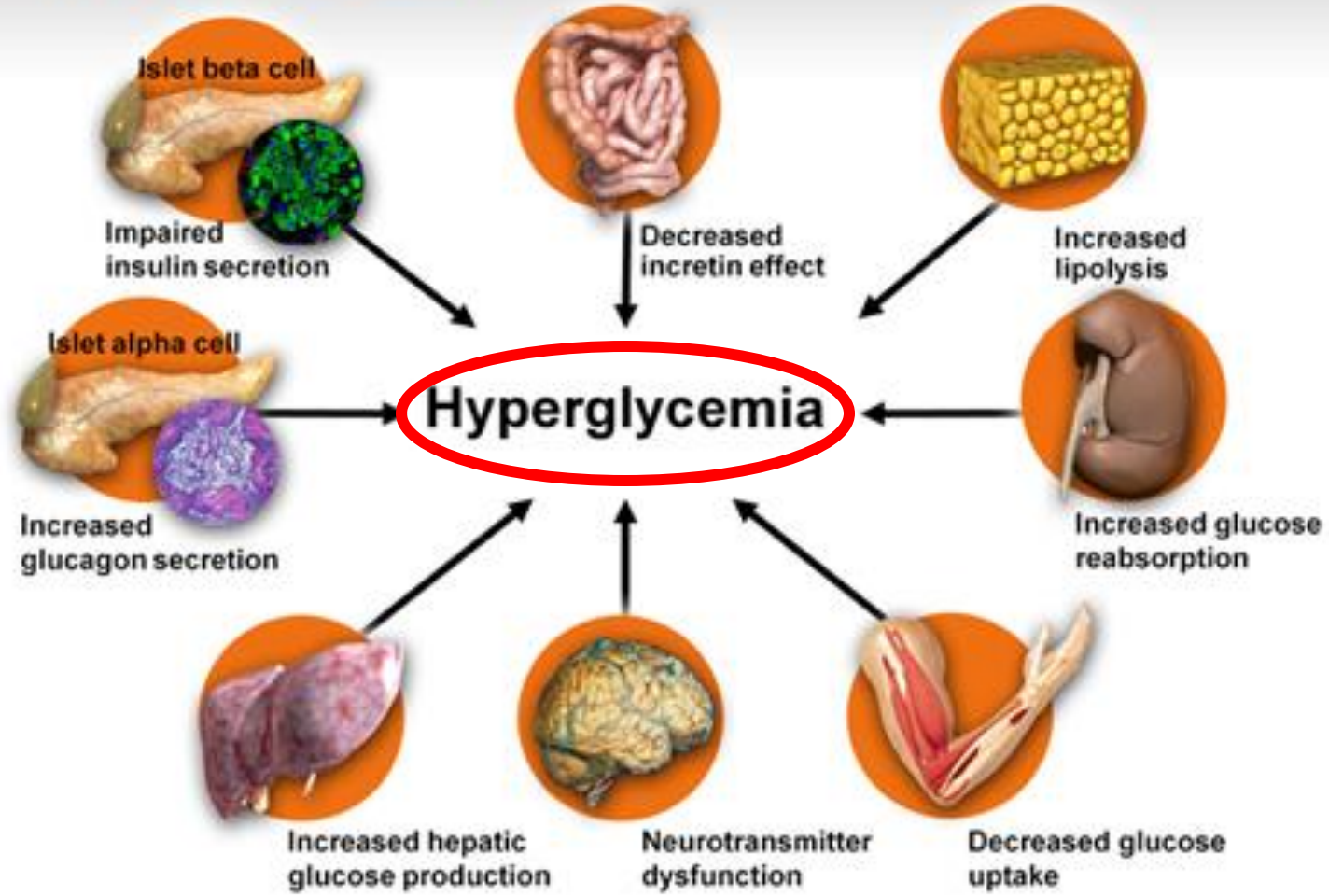
Making up for lost time  
(will take 6–12 months for services to catch up)<sup>4</sup>

**Significant backlog of patients**

HbA<sub>1c</sub>, glycated haemoglobin; Jan, January; Sep, September.

1. Carr, MJ, et al. *Lancet Diabetes Endocrinol.* 2021. doi: 10.1016/S2213-8587(21)00116-9. Available from: [https://www.thelancet.com/journals/landia/article/PIIS2213-8587\(21\)00116-9/fulltext](https://www.thelancet.com/journals/landia/article/PIIS2213-8587(21)00116-9/fulltext). [Accessed June 2021] 2. National Diabetes Audit - Care Processes and Treatment Targets, Quarterly Data Release, January to September 2020. Available from <https://digital.nhs.uk/data-and-information/publications/statistical/national-diabetes-audit/care-processes-and-treatment-targets-2nd-quarter-january-september-2020-data-release> [Accessed May 2021]. 3. National Diabetes Audit- Care Processes and Treatment Targets 2019-20, Data release. Available from <https://digital.nhs.uk/data-and-information/publications/statistical/national-diabetes-audit/care-processes-and-treatment-targets-2019-20-data-release> [Accessed May 2021]. 4. Brown P, Diggle J. *Diabetes Prim Care.* 2020;22:97–98.

# Ominous Octet



## ...with a **COMPLEX** therapy

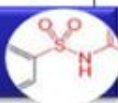
- Detemir
- Glargine
- Degludec
- Lispro
- Aspart
- Glulisine
- Regular human

### INSULIN



- Glicazide
- Glibenclamide
- Glimepiride
- Tolbutamide
- Chlorpropamide
- Glyburide

### SULFONYLUREAS



- Nateglinide
- Repaglinide

### GLINIDES



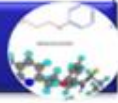
- Metformin
- Phenformin

### BIGUANIDES



- Pioglitazone

### TZDs



- Sitagliptin
- Saxagliptin
- Vildagliptin
- Linagliptin

### DPP-IV INHIBITORS



- Exenatide
- Exenatide LAR
- Liraglutide
- Lixisenatide

### INCRETINS



- Acarbose
- Miglitol

### ALPHA GLUCOSIDASES INHIBITORS



- Dapagliflozin
- Ertugliflozin
- Canagliflozin
- Empagliflozin

### SGLT2 INHIBITORS



EASD  
2018  
BERLIN



54th Annual Meeting of the  
European Association for the  
Study of Diabetes

1-5 October 2018

They conclude: "The management of hyperglycaemia in type 2 diabetes has become increasingly complex with the number of glucose-lowering medications now available."





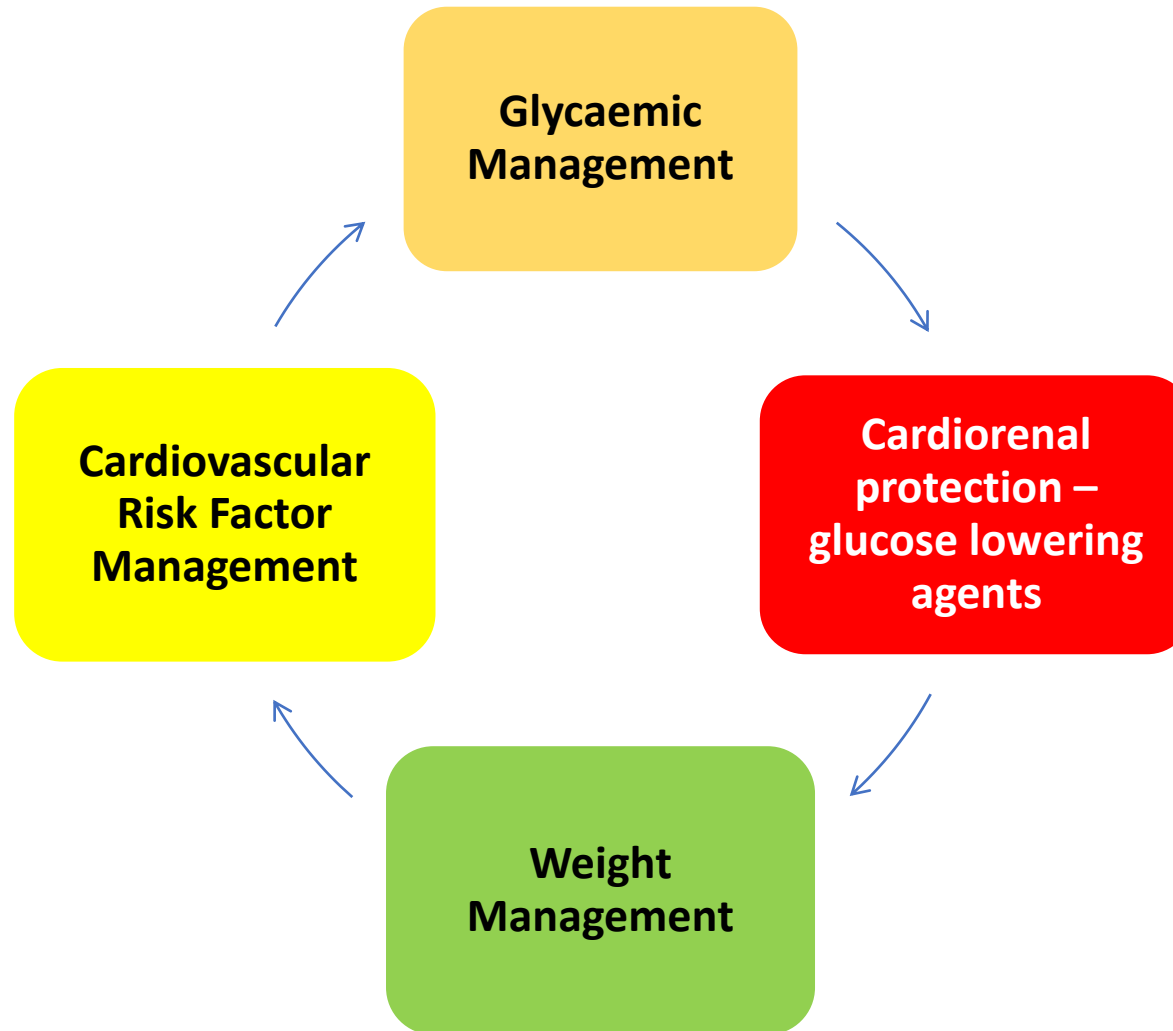
# Putting the Person with Diabetes at the Centre of Care



Davies MJ, Aroda VR, Collins BS, Gabbay RA, Green J, Maruthur NM, Rosas SE, Del Prato S, Mathieu C, Mingrone G, Rossing P, Tankova T, Tsapas A, Buse JB

*Diabetes Care* 2022; <https://doi.org/10.2337/dci22-0034>. *Diabetologia* 2022; <https://doi.org/10.1007/s00125-022-05787-2>.

# Preventing Complications



Davies MJ, Aroda VR, Collins BS, Gabbay RA, Green J, Maruthur NM, Rosas SE, Del Prato S, Mathieu C, Mingrone G, Rossing P, Tankova T, Tsapas A, Buse JB

*Diabetes Care* 2022; <https://doi.org/10.2337/dci22-0034>. *Diabetologia* 2022; <https://doi.org/10.1007/s00125-022-05787-2>.

# Importance of Glycaemic Control

Averting symptomatic hyperglycaemia

Substantial and enduring reduction in microvascular complications

- 50-76% reduction DCCT with HbA1c 7% vs 9%
- 25% reduction UKPDS with HbA1c 7% vs 7.9%
- Greatest benefit with reduction from higher levels of HbA1c

Uncertainty regarding macrovascular benefit of BG control in T2D

Benefits emerge slowly while harms of glucose control medications can be more immediate

# What are the new changes ?

**Cardio-Renal**

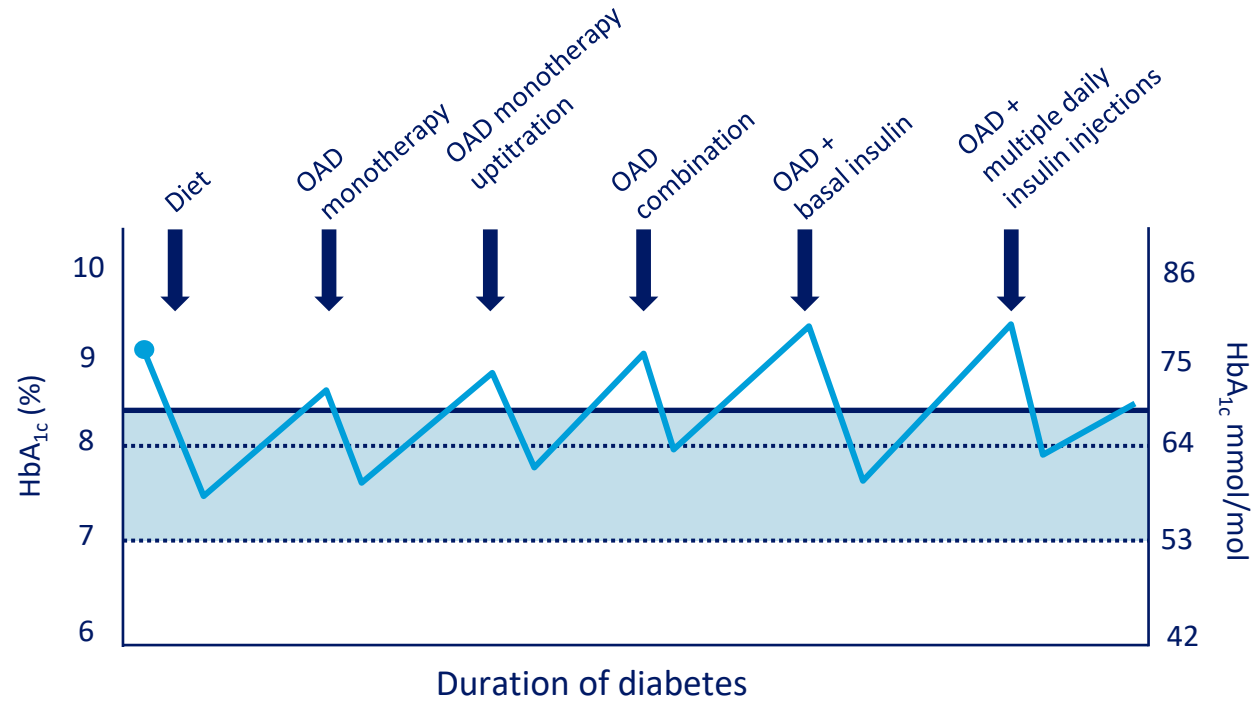
**Weight  
Reduction as a  
Targeted  
Intervention**

**Diabetes Self-  
Management  
Education and  
Support  
(DSMES)**

**Clinical inertia**

**Use of  
Combinations**

### Traditional stepwise approach<sup>1</sup>

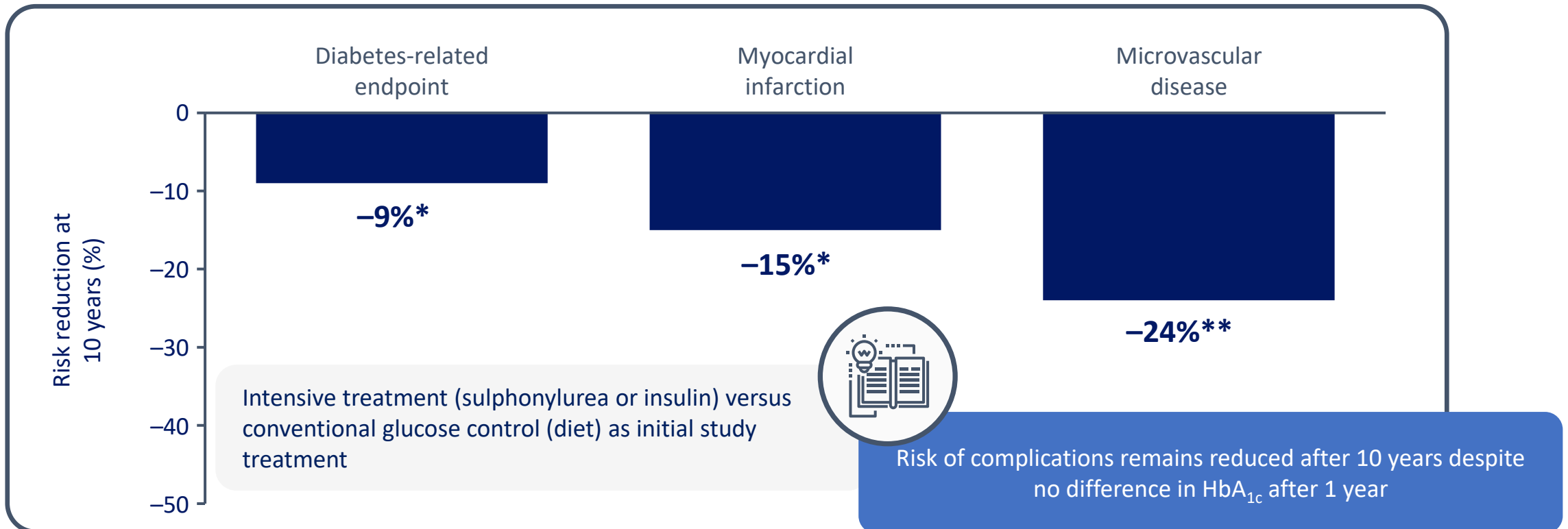


Adapted from Del Prato S, et al. *Int J Clin Pract.* 2005;59:1345–1355 and Campbell IW. *Br J Cardiol.* 2000;7:625–631.

HbA<sub>1c</sub>, glycated haemoglobin; OAD, oral anti-diabetes drug.

1. Del Prato S, et al. *Int J Clin Pract.* 2005;59:1345–1355. 2. Campbell IW. *Br J Cardiol.* 2000;7:625–631.

# The benefits of early good glucose control persist long-term: Legacy effect<sup>1</sup>



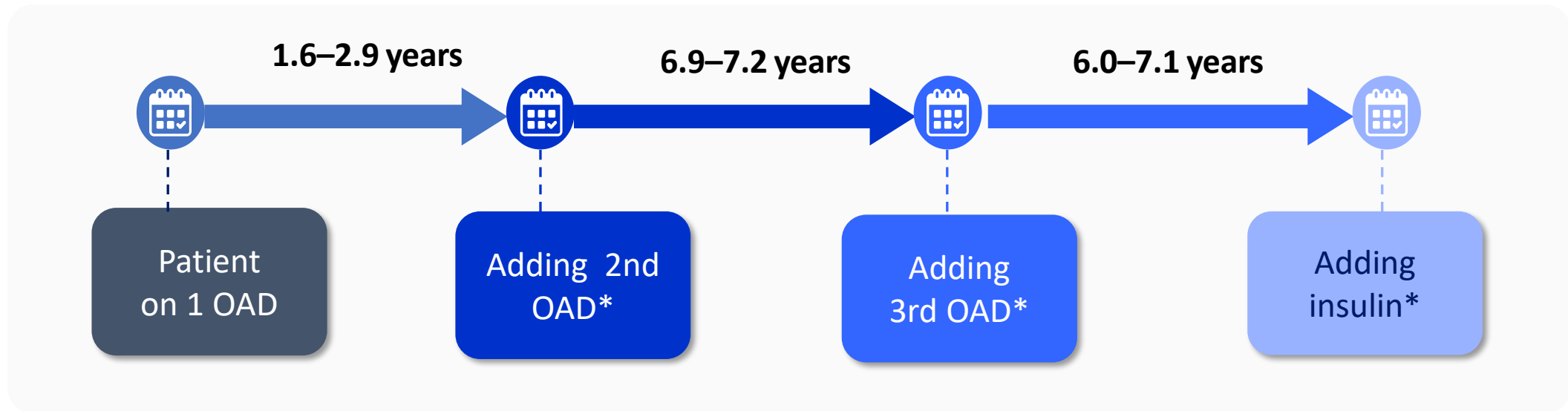
\* $p < 0.05$ ; \*\* $p = 0.001$  intensive vs. conventional treatment.

Results are based on patients who were followed for up to 30 years, including up to 10 years of post-trial monitoring, with aggregate clinical outcomes after assignment in the interventional phase of the United Kingdom Prospective Diabetes Study to the sulphonylurea–insulin group or to the corresponding conventional-therapy group. Intensive therapy with sulphonylurea or insulin,  $N = 2729$ ; Conventional therapy with diet,  $N = 1138$ . HbA<sub>1c</sub>, glycated haemoglobin.

1. Holman RR, et al. *N Engl J Med*. 2008;359:1577–1589.

# Therapeutic Inertia for people with T2D may contribute to patients living with suboptimal glycaemic control over many years<sup>1</sup>

## Substantial inertia exists at each sequential intensification step



\*HbA<sub>1c</sub> cutoff points are presented as a range of years depending on baseline HbA<sub>1c</sub> levels of ≥7.0% (≥53 mmol/mol), ≥7.5% (≥58 mmol/mol), ≥8.0% (≥64 mmol/mol).

T2D, type 2 diabetes; OAD, oral antidiabetes drug.  
1. Khunti K, et al. *Diabetes Care*. 2013;36:3411–3417.

# Therapeutic inertia is complex and multifaceted<sup>1</sup>

## Patient-related

- Lack of understanding of their condition
- Misunderstanding of treatment regimens and multimorbidity
- Frustration with treatment and not reaching target blood glucose levels
- Trypanophobia
- Pain from injections and blood tests
- Fear of self-monitoring
- Noncompliance
- Socioeconomic status
- Acute intervening illness
- Concerns over side effects



**30%**

## HCP-related

- Competing demands
- Lack of knowledge
- Variations in guideline implementation
- Underestimation of need for therapy
- HCP perceptions that glycaemic control is improving
- Communication barriers
- Patients experiencing pain from injections



**50%**

## Healthcare system-related

- Lack of individualised guidelines for patients
- Healthcare issues and costs of new medications
- Limited access to medicines
- Availability of specialist nurses
- Early diagnosis and management
- Lack of psychological support



**20%**

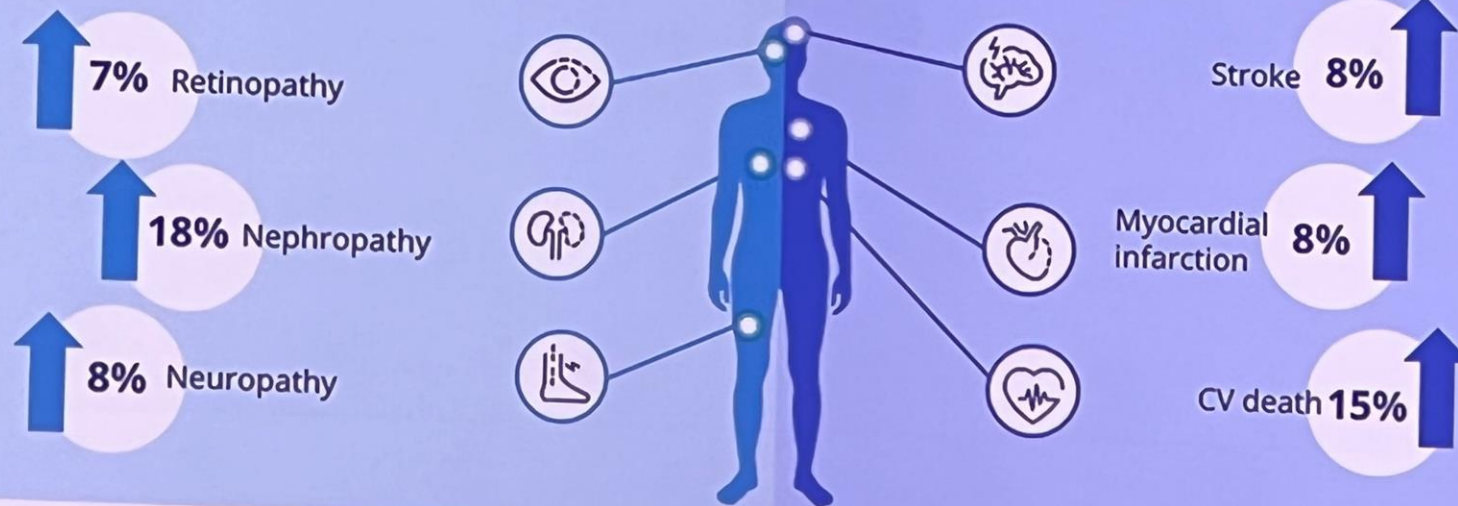
Estimated contributions



# Improved glucose levels associated with reduced risk of diabetes complications

**A 1-year clinical inertia scenario is associated with a significant increase in risk for the following comorbidities<sup>1</sup>:**

In this scenario, clinical inertia based on HbA<sub>1c</sub> values every 3 months, which determines if the individual needs treatment intensification



CV, cardiovascular.  
1. Correa MF et al. J Gen Intern Med 2019;34:372-8

# FIGURE 4: HOLISTIC PERSON-CENTRED APPROACH TO T2DM MANAGEMENT



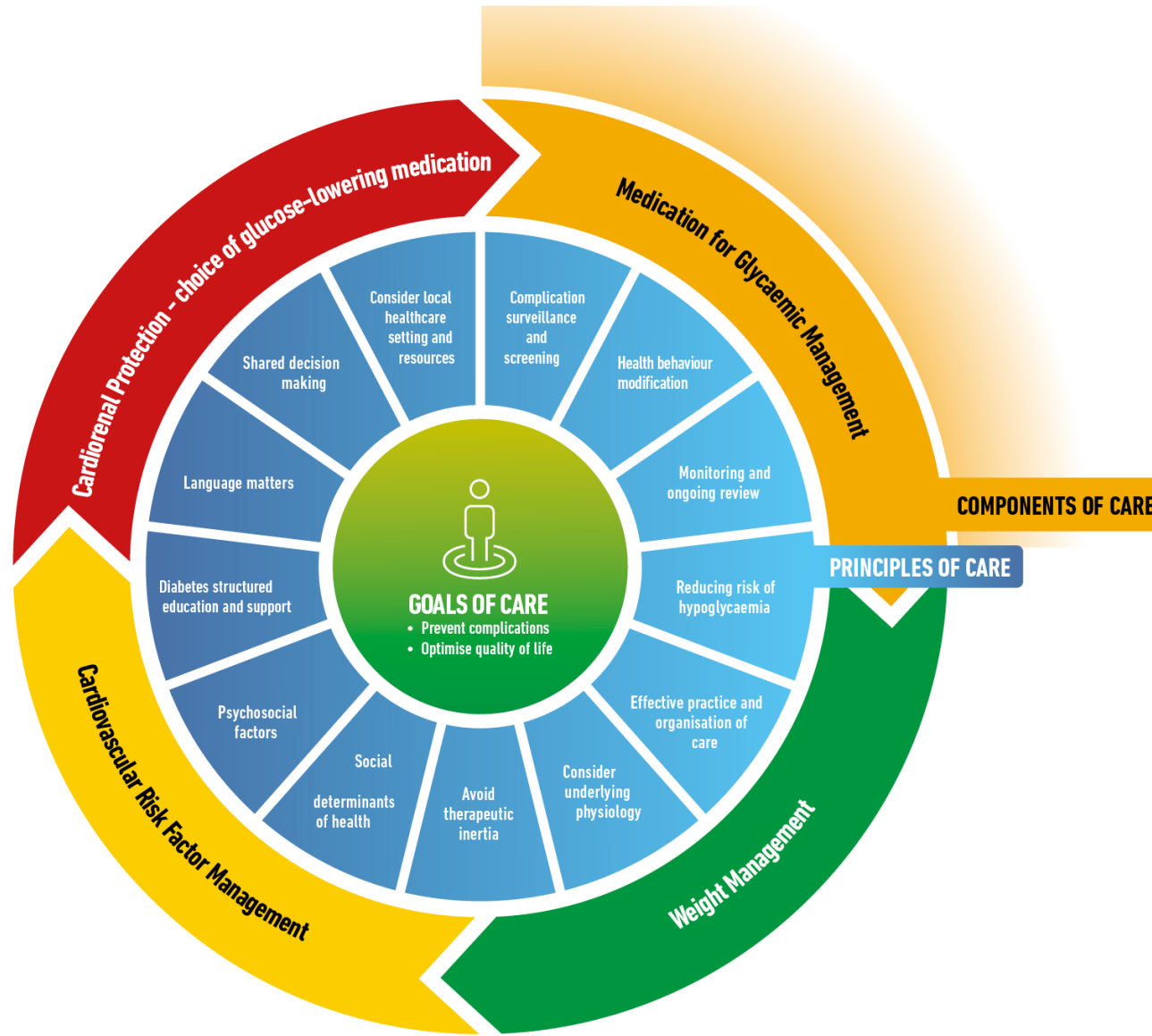
1 = American Diabetes Association Professional Practice Committee. 10. Cardiovascular Disease and Risk Management: Standards of Medical Care in Diabetes-2022. *Diabetes Care*. 2022 Jan 1;45(Suppl 1):S144-74.

ACEi, Angiotensin-Converting Enzyme Inhibitor; ARB, Angiotensin Receptor Blockers; ASCVD, Atherosclerotic Cardiovascular Disease; BP, Blood Pressure; CKD, Chronic Kidney Disease; CV, Cardiovascular; eGFR, Estimated Glomerular Filtration Rate; GLP-1 RA, Glucagon-Like Peptide-1 Receptor Agonist; HF, Heart Failure; SGLT2i, Sodium-Glucose Cotransporter-2 Inhibitor; T2D, Type 2 Diabetes.

Davies MJ, Aroda VR, Collins BS, Gabbay RA, Green J, Maruthur NM, Rosas SE, Del Prato S, Mathieu C, Mingrone G, Rossing P, Tankova T, Tsapas A, Buse JB

*Diabetes Care* 2022; <https://doi.org/10.2337/dci22-0034>. *Diabetologia* 2022; <https://doi.org/10.1007/s00125-022-05787-2>.

**FIGURE 4: HOLISTIC PERSON-CENTRED APPROACH TO T2DM MANAGEMENT**



**Glycaemic Management: Choose approaches that provide the efficacy to achieve goals:**

Metformin OR Agent(s) including COMBINATION therapy that provide adequate EFFICACY to achieve and maintain treatment goals

Consider avoidance of hypoglycaemia a priority in high-risk individuals

1 = American Diabetes Association Professional Practice Committee. 10. Cardiovascular Disease and Risk Management: Standards of Medical Care in Diabetes-2022. *Diabetes Care*. 2022 Jan 1;45(Suppl 1):S144-74.

ACEi, Angiotensin-Converting Enzyme Inhibitor; ARB, Angiotensin Receptor Blockers; ASCVD, Atherosclerotic Cardiovascular Disease; BP, Blood Pressure; CKD, Chronic Kidney Disease; CV, Cardiovascular; eGFR, Estimated Glomerular Filtration Rate; GLP-1 RA, Glucagon-Like Peptide-1 Receptor Agonist; HF, Heart Failure; SGLT2i, Sodium-Glucose Cotransporter-2 Inhibitor; T2D, Type 2 Diabetes.

**FIGURE 4: HOLISTIC PERSON-CENTRED APPROACH TO T2DM MANAGEMENT**



**Achievement and Maintenance of Weight Management Goals:**

Set individualised weight management goals

- General lifestyle advice: medical nutrition therapy/eating patterns/physical activity
- Intensive evidence-based structured weight management programme
- Consider medication for weight loss
- Consider metabolic surgery

**When choosing glucose-lowering therapies:**

Consider regimen with high-to-very-high dual glucose and weight efficacy






1 = American Diabetes Association Professional Practice Committee. 10. Cardiovascular Disease and Risk Management: Standards of Medical Care in Diabetes-2022. *Diabetes Care*. 2022 Jan 1;45(Suppl 1):S144-74.

ACEi, Angiotensin-Converting Enzyme Inhibitor; ARB, Angiotensin Receptor Blockers; ASCVD, Atherosclerotic Cardiovascular Disease; BP, Blood Pressure; CKD, Chronic Kidney Disease; CV, Cardiovascular; eGFR, Estimated Glomerular Filtration Rate; GLP-1 RA, Glucagon-Like Peptide-1 Receptor Agonist; HF, Heart Failure; SGLT2i, Sodium-Glucose Cotransporter-2 Inhibitor; T2D, Type 2 Diabetes.

# FIGURE 4: HOLISTIC PERSON-CENTRED APPROACH TO T2DM MANAGEMENT



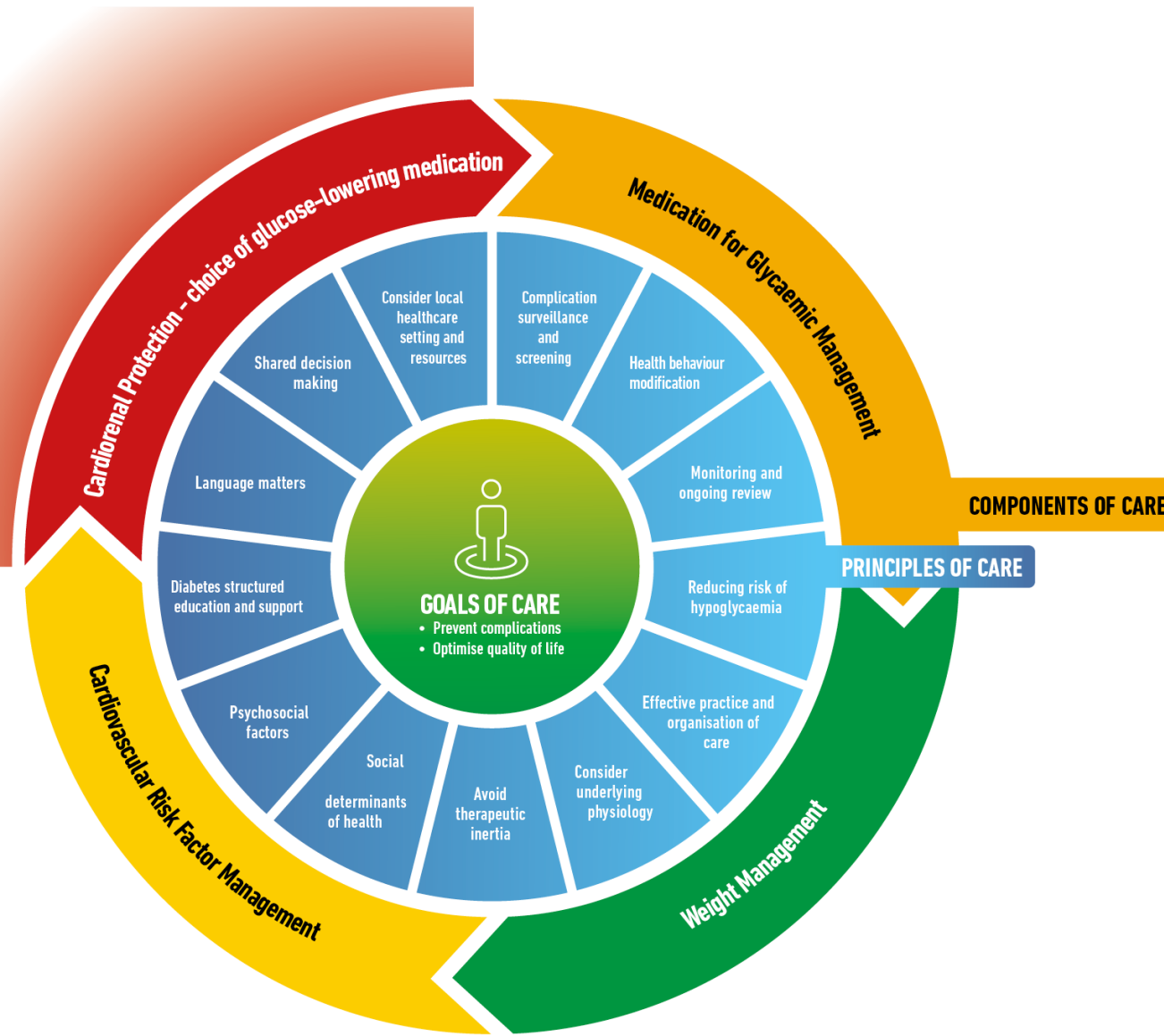
Ensure strategies are in place to detect and optimise management of CV risk factors<sup>1</sup> including

-  CV risk factor screening and surveillance
-  BP lowering
-  Lipid lowering
-  Antithrombotic agents
-  Smoking cessation

<sup>1</sup> = American Diabetes Association Professional Practice Committee. 10. Cardiovascular Disease and Risk Management: Standards of Medical Care in Diabetes-2022. *Diabetes Care*. 2022 Jan 1;45(Suppl 1):S144–74.

ACEi, Angiotensin-Converting Enzyme Inhibitor; ARB, Angiotensin Receptor Blockers; ASCVD, Atherosclerotic Cardiovascular Disease; BP, Blood Pressure; CKD, Chronic Kidney Disease; CV, Cardiovascular; eGFR, Estimated Glomerular Filtration Rate; GLP-1 RA, Glucagon-Like Peptide-1 Receptor Agonist; HF, Heart Failure; SGLT2i, Sodium-Glucose Cotransporter-2 Inhibitor; T2D, Type 2 Diabetes.

# FIGURE 4: HOLISTIC PERSON-CENTRED APPROACH TO T2DM MANAGEMENT



**+CKD (on maximally tolerated dose of ACEi/ARB)**

**PREFERABLY**

SGLT2i with primary evidence of reducing CKD progression

Use SGLT2i in people with an eGFR  $\geq 20$  ml/min per  $1.73$  m<sup>2</sup>; once initiated should be continued until initiation of dialysis or transplantation

OR

GLP-1 RA with proven CVD benefit if SGLT2i not tolerated or contraindicated

If additional cardiorenal risk reduction or glycaemic control needed consider combination SGLT2/GLP-1 RA

**+ASCVD/Indicators of High Risk**

GLP-1 RA with proven CVD benefit **EITHER/OR** SGLT2i with proven CVD benefit

If additional cardiorenal risk reduction or glycaemic control needed consider combination SGLT2/GLP-1 RA

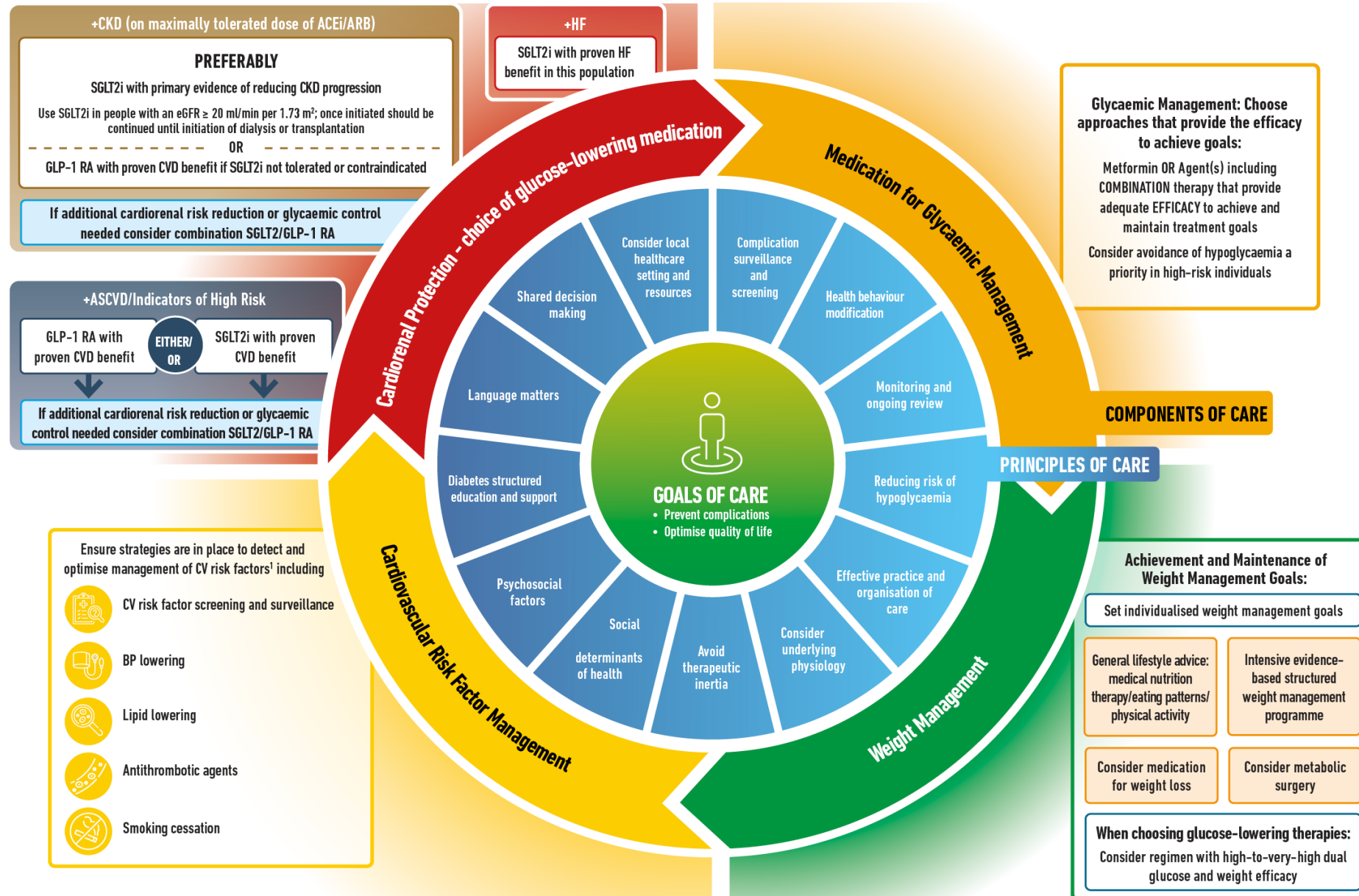
**+HF**

SGLT2i with proven HF benefit in this population

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# FIGURE 4: HOLISTIC PERSON-CENTRED APPROACH TO T2DM MANAGEMENT



Davies MJ, Aroda VR, Collins BS, Gabbay RA, Green J, Maruthur NM, Rosas SE, Del Prato S, Mathieu C, Mingrone G, Rossing P, Tankova T, Tsapas A, Buse JB

Diabetes Care 2022; <https://doi.org/10.2337/dci22-0034>. Diabetologia 2022; <https://doi.org/10.1007/s00125-022-05787-2>.

1 = American Diabetes Association Professional Practice Committee. 10. Cardiovascular Disease and Risk Management: Standards of Medical Care in Diabetes-2022. Diabetes Care. 2022 Jan 1;45(Suppl 1):S144-74.

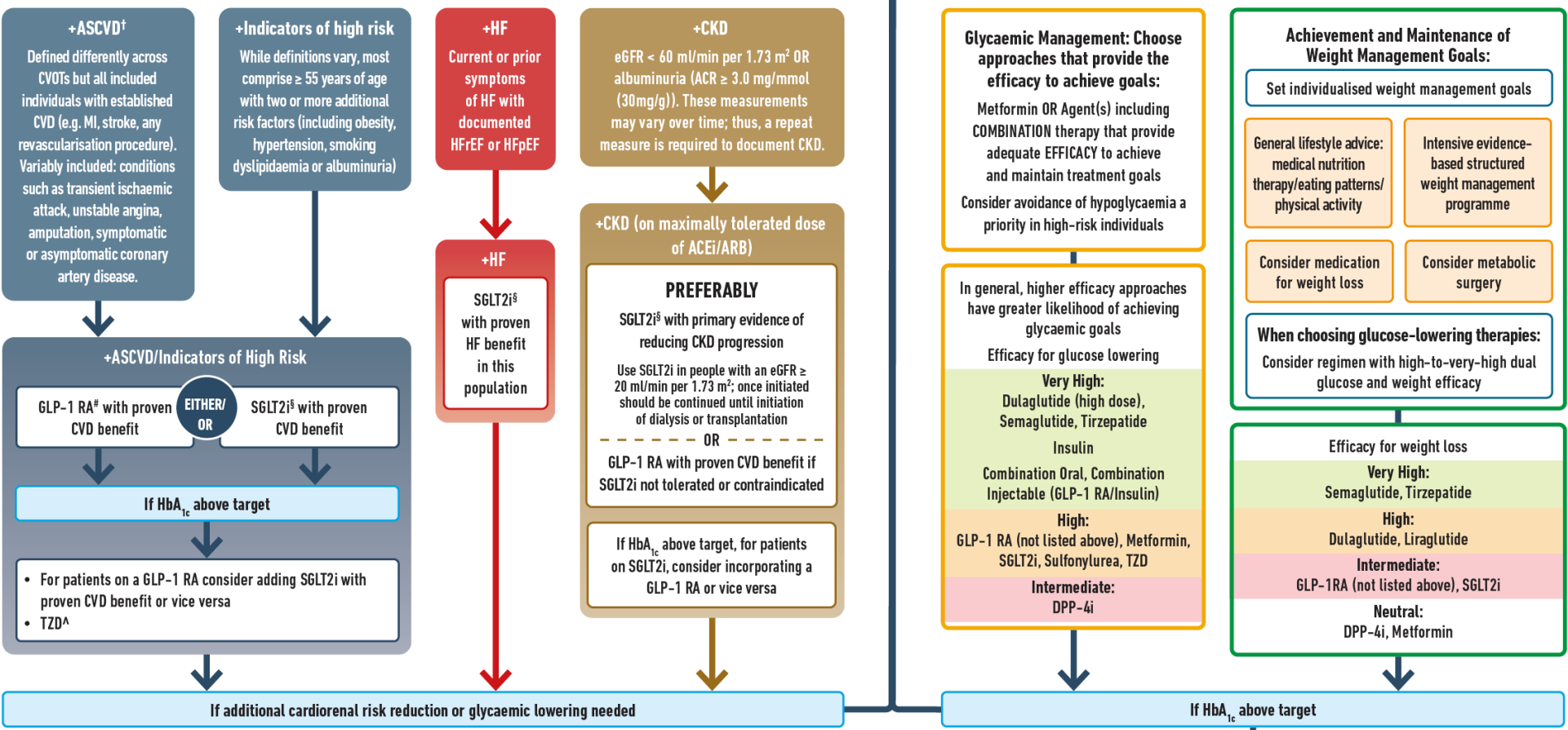
ACEi, Angiotensin-Converting Enzyme Inhibitor; ARB, Angiotensin Receptor Blockers; ASCVD, Atherosclerotic Cardiovascular Disease; BP, Blood Pressure; CKD, Chronic Kidney Disease; CV, Cardiovascular; eGFR, Estimated Glomerular Filtration Rate; GLP-1 RA, Glucagon-Like Peptide-1 Receptor Agonist; HF, Heart Failure; SGLT2i, Sodium-Glucose Cotransporter-2 Inhibitor; T2D, Type 2 Diabetes.

# FIGURE 3: USE OF GLUCOSE-LOWERING MEDICATIONS IN THE MANAGEMENT OF TYPE 2 DIABETES



HEALTHY LIFESTYLE BEHAVIOURS; DIABETES SELF-MANAGEMENT EDUCATION AND SUPPORT (DSMES); SOCIAL DETERMINANTS OF HEALTH (SDOH)

**Goal: Cardiorenal Risk Reduction in High-Risk Patients with Type 2 Diabetes (In addition to comprehensive CV risk management)\***      **Goal: Achievement and Maintenance of Glycaemic and Weight Management Goals**



ACEi, Angiotensin-Converting Enzyme Inhibitor; ACR, Albumin/Creatinine Ratio; ARB, Angiotensin Receptor Blocker; ASCVD, Atherosclerotic Cardiovascular Disease; CGM, Continuous Glucose Monitoring; CKD, Chronic Kidney Disease; CV, Cardiovascular; CVD, Cardiovascular Disease; CVOT, Cardiovascular Outcomes Trial; DPP-4i, Dipeptidyl Peptidase-4 Inhibitor; eGFR, Estimated Glomerular Filtration Rate; GLP-1 RA, Glucagon-Like Peptide-1 Receptor Agonist; HF, Heart Failure; HFpEF, Heart Failure with preserved Ejection Fraction; HFrEF, Heart Failure with reduced Ejection Fraction; HHF, Hospitalisation for Heart Failure; MACE, Major Adverse Cardiovascular Events; MI, Myocardial Infarction; SDOH, Social Determinants of Health; SGLT2i, Sodium-Glucose Cotransporter-2 Inhibitor; TZD, Type 2 Diabetes; TZD, Thiazolidinedione.

\* In people with HF, CKD, established CVD or multiple risk factors for CVD, the decision to use a GLP-1 RA or SGLT2i with proven benefit should be independent of background use of metformin; † A strong recommendation is warranted for people with CVD and a weaker recommendation for those with indicators of high CV risk. Moreover, a higher absolute risk reduction and thus lower numbers needed to treat are seen at higher levels of baseline risk and should be factored into the shared decision-making process. See text for details; <sup>^</sup> Low-dose TZD may be better tolerated and similarly effective; § For SGLT2i, CV/renal outcomes trials demonstrate their efficacy in reducing the risk of composite MACE, CV death, all-cause mortality, MI, HHF and renal outcomes in individuals with T2D with established/high risk of CVD; # For GLP-1 RA, CVOTs demonstrate their efficacy in reducing composite MACE, CV death, all-cause mortality, MI, stroke and renal endpoints in individuals with T2D with established/high risk of CVD.

**Identify barriers to goals:**

- Consider DSMES referral to support self-efficacy in achievement of goals
- Consider technology (e.g. diagnostic CGM) to identify therapeutic gaps and tailor therapy
- Identify and address SDOH that impact on achievement of goals

Davies MJ, Aroda VR, Collins BS, Gabbay RA, Green J, Maruthur NM, Rosas SE, Del Prato S, Mathieu C, Mingrone G, Rossing P, Tankova T, Tsapas A, Buse JB



# IMPORTANCE OF INTEGRATED CARE



Acknowledge the lifelong and evolving nature of type 2 diabetes.



Identify and coordinate with the team.



Know your local resources.



Language matters in diabetes care.

# PLACE OF TECHNOLOGY



Technology can be useful in people with type 2 diabetes but needs to be part of an holistic plan of care and supported by DSMES.



Consider CGM in people with type 2 diabetes on insulin.



Adapt the clinic/system to optimise effective use of technology among people with type 2 diabetes, particularly to support behaviour change through self-monitoring.

# A multifactorial approach can improve management of T2D and its complications

The ADA recommends that most adults with diabetes achieve the following targets:

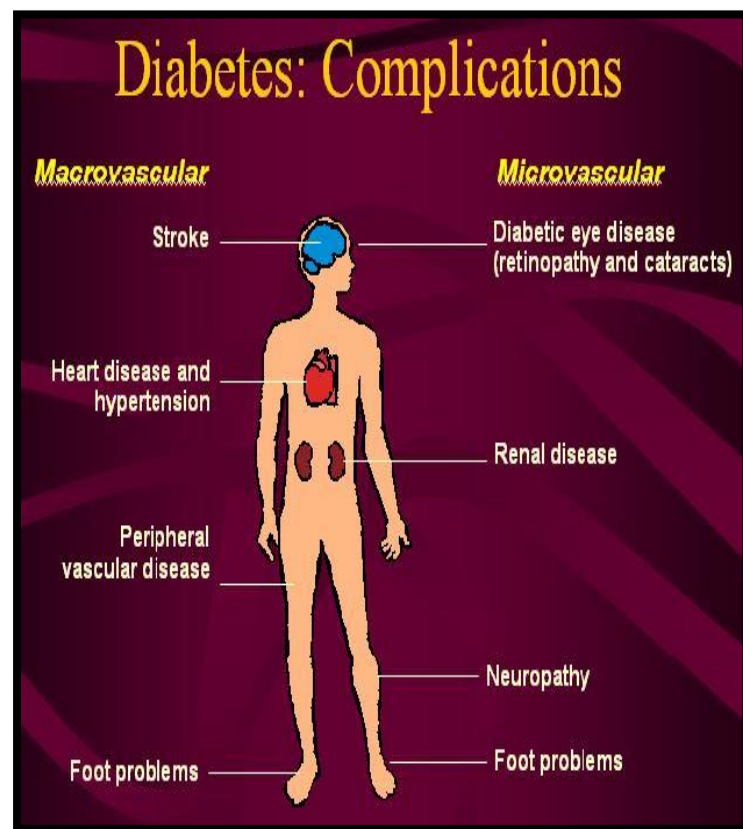
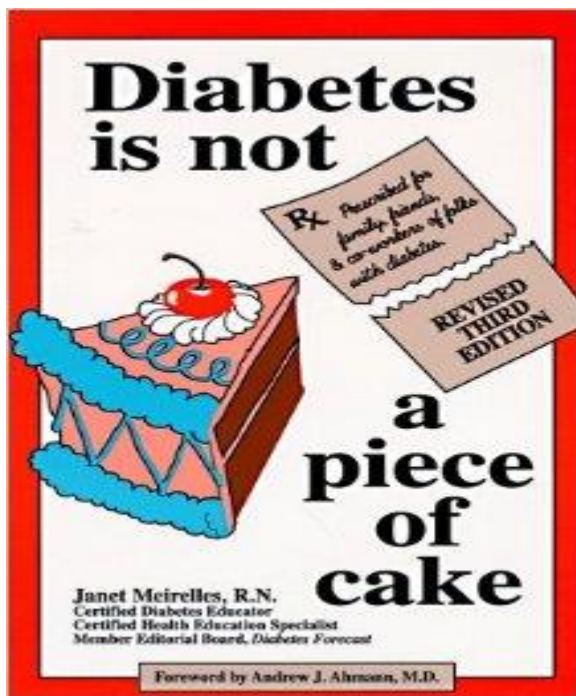
- HbA<sub>1c</sub>: <7.0% (<53 mmol/mol)
- Physical activity: ≥150 mins per week\*
- Blood pressure: <140/90 mmHg
- Triglycerides: 1.7 mmol/L
- HDL-C:
  - Women ≥1.3 mmol/L
  - Men ≥1.0 mmol/L

## Management of diabetes and its complications

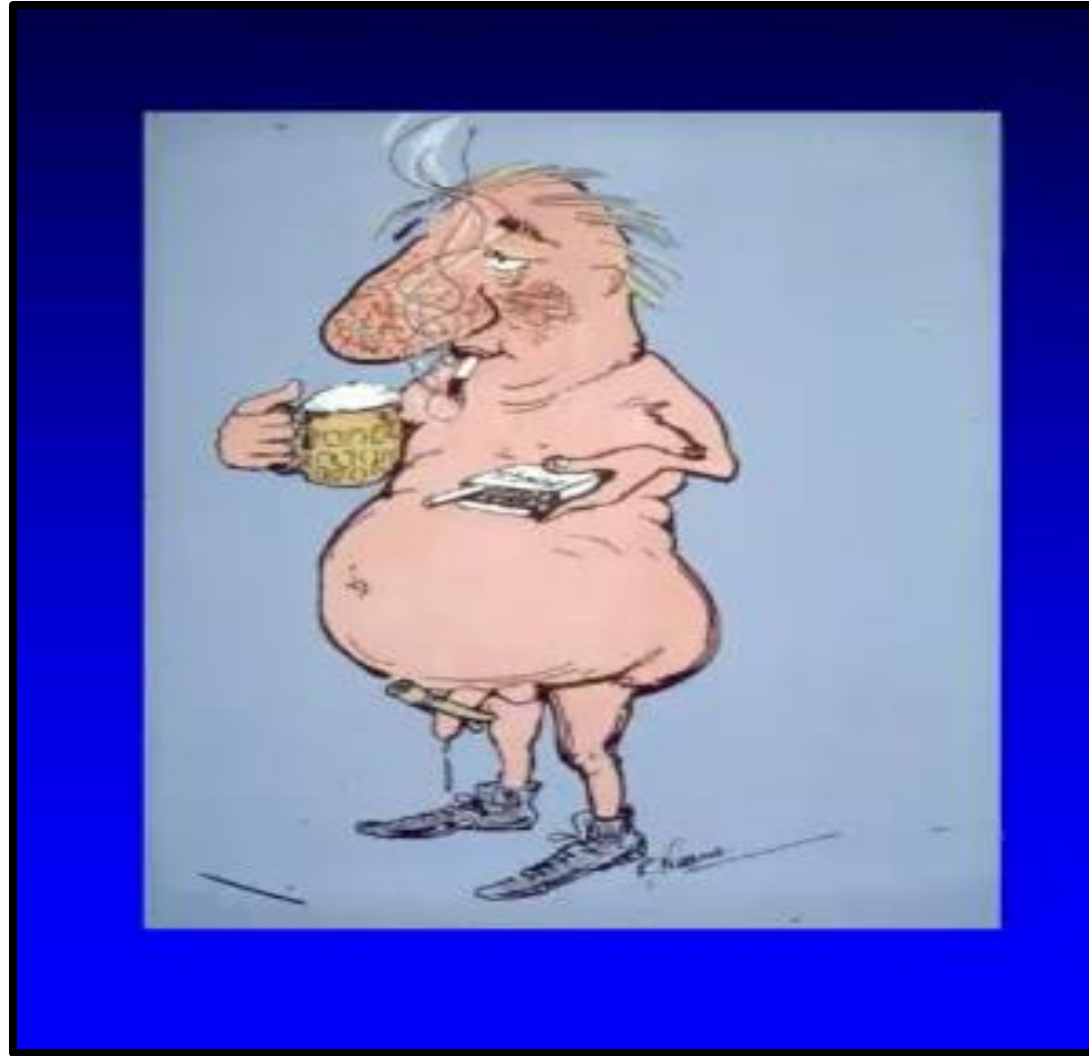


\*Physical activity of moderate to vigorous intensity.

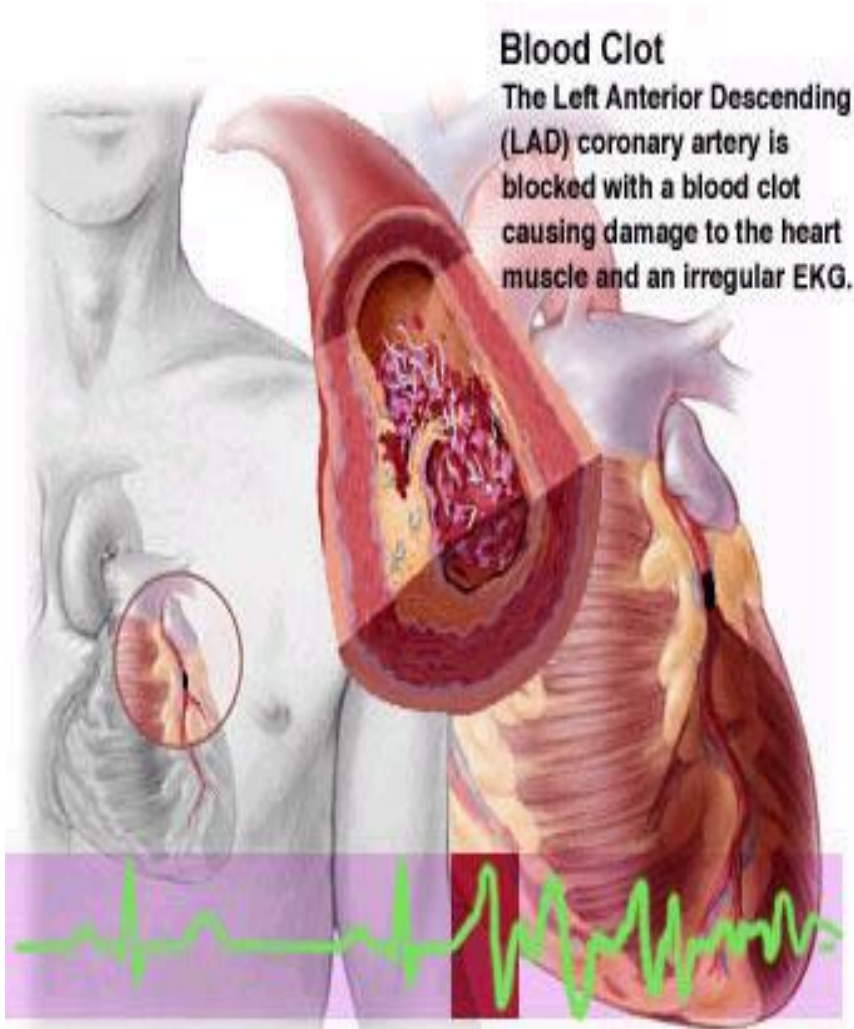
ACE-I, angiotensin-converting enzyme inhibitors; ADA, American Diabetes Association; ARB, angiotensin receptor blockers; BP, blood pressure; HbA<sub>1c</sub>, glycated haemoglobin; HDL-C, high-density lipoprotein cholesterol; T2D, type 2 diabetes. Adapted from American Diabetes Association. Diabetes Care 2021;44(Suppl 1).



# Diabetes is Not Only Polyuria



# Macro vascular Complications



**68%** will have Heart Disease

**16%** will have Stroke

**75%** will have Hypertension

- Ischemic heart disease
- Cerebrovascular disease
- Peripheral vascular disease

**65%** will have Nerve Damage **60%** of amputation happens with diabetics



- **Ulceration (painless)**
- **Neuropathic edema**
- **Charcot arthropathy**
- **Callosities**

**A foot ulcer is a break in the skin or a deep sore which can become infected.**





# Uncontrolled diabetic patient is at high risk to loose his vision

Are Your Blood Sugars Out of Control? Signs to Look For



# Treating Diabetes



*\*Take  
home message*





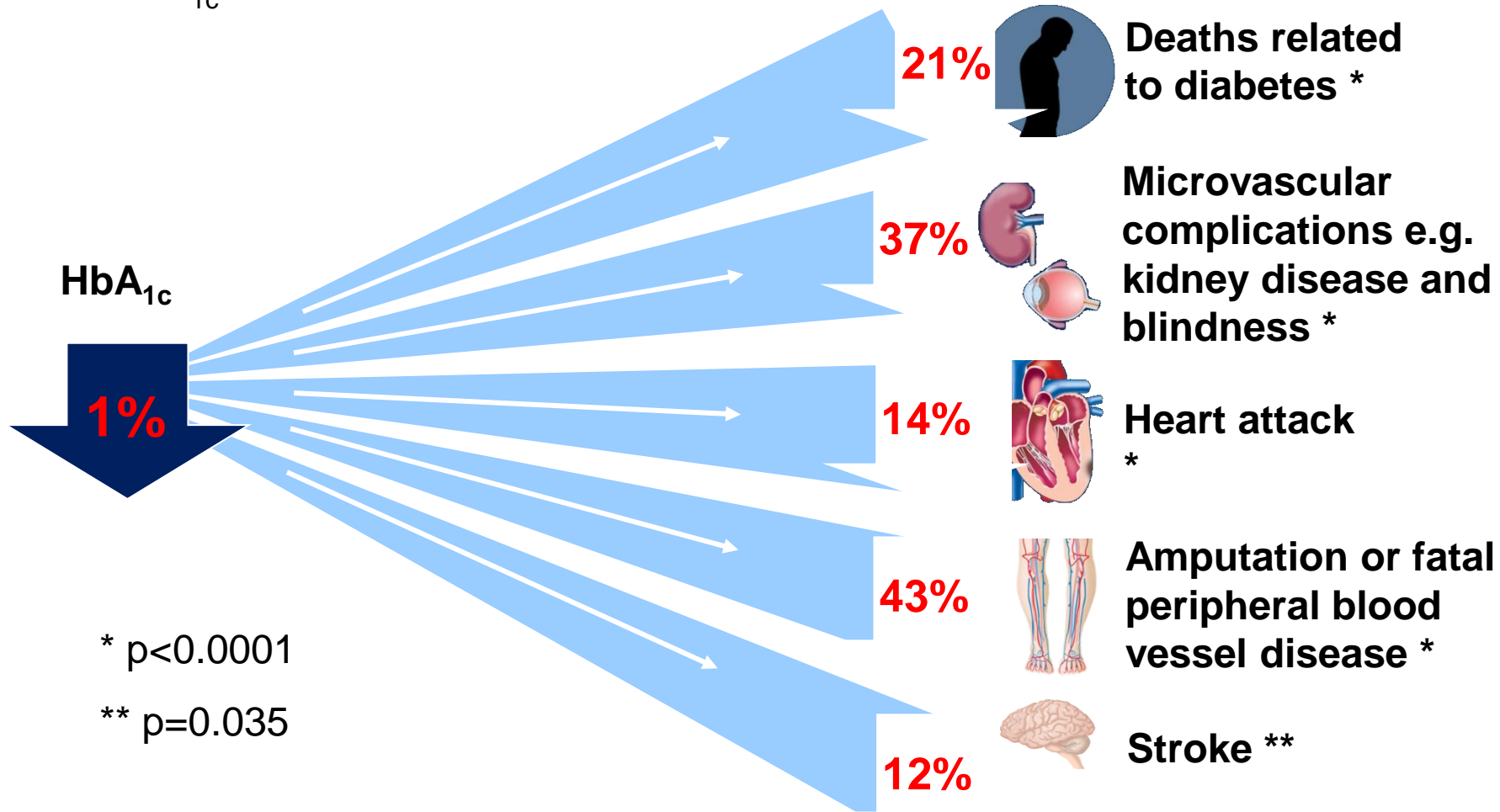


*\*Take  
home message*



# UKPDS: Tight Glycaemic Control Reduces Complications

Epidemiological extrapolation showing benefit of a 1% reduction in mean HbA<sub>1c</sub>





**Community  
Diabetes Service**



**Adult Transitional  
Diabetes Clinic**



**Preconception  
Clinic**



**Inpatient Diabetes  
Service**



**Diabetes Team BVH**

**Antenatal MDT  
Clinic**



**Diabetic Foot MDT  
Clinic**



**Insulin Pump  
Clinic**



**Type 2 Diabetes  
Clinic**

**Type 1 Diabetes  
Clinic**







Thank  
you

