



Type 2 Diabetes

DR SEB PILLON

Why care about Type 2 Diabetes?

- Globally, prevalence was 382 million in 2012, and 415 million in 2015
 - By 2040, that will be 640 million (**10% global population**).
- In the UK, prevalence is around 6% of adults.
 - 3.6 million people who have been diagnosed with diabetes in the UK.
 - By 2025, around 5 million adults will have type 2 diabetes.
- People with T2DM have increased risk of:
 - Stroke (2-fold)
 - Myocardial Infarction (55%)
 - Death (2-5 times)
 - Sight problems (7% of blind people are because of diabetes)



Normal Vision



Vision with Diabetic Retinopathy



Diabetic Retinopathy



Normal Vision



Same scene viewed by a person with diabetic retinopathy

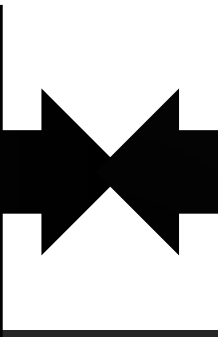


20 amputations per day in England amongst people with diabetes



"I had a black dog, his name was depression"
WHO You Tube Channel

People with diabetes are twice as likely to suffer an episode of depression. They have depressive episodes for longer periods than those without diabetes and they may recur more frequently



People who suffer with depression however are very likely to develop Type 2 diabetes – with a 60 per cent increased risk

Other complications

Cardiovascular Disease

- 138.8% increased risk of angina, 94.2% increased risk of myocardial infarction; 126.2% increased risk of heart failure; 62.5% increased risk of stroke among people with both types of diabetes

Renal Disease

- About 75% people with diabetes will develop some stage of kidney disease during their lifetime with the condition with nearly 20% developing overt kidney disease needing treatment

Neuropathies

- Affect 50% of those with diabetes; includes gastroparesis, CAN and chronic painful neuropathy

Pregnancy Complications

Dementia

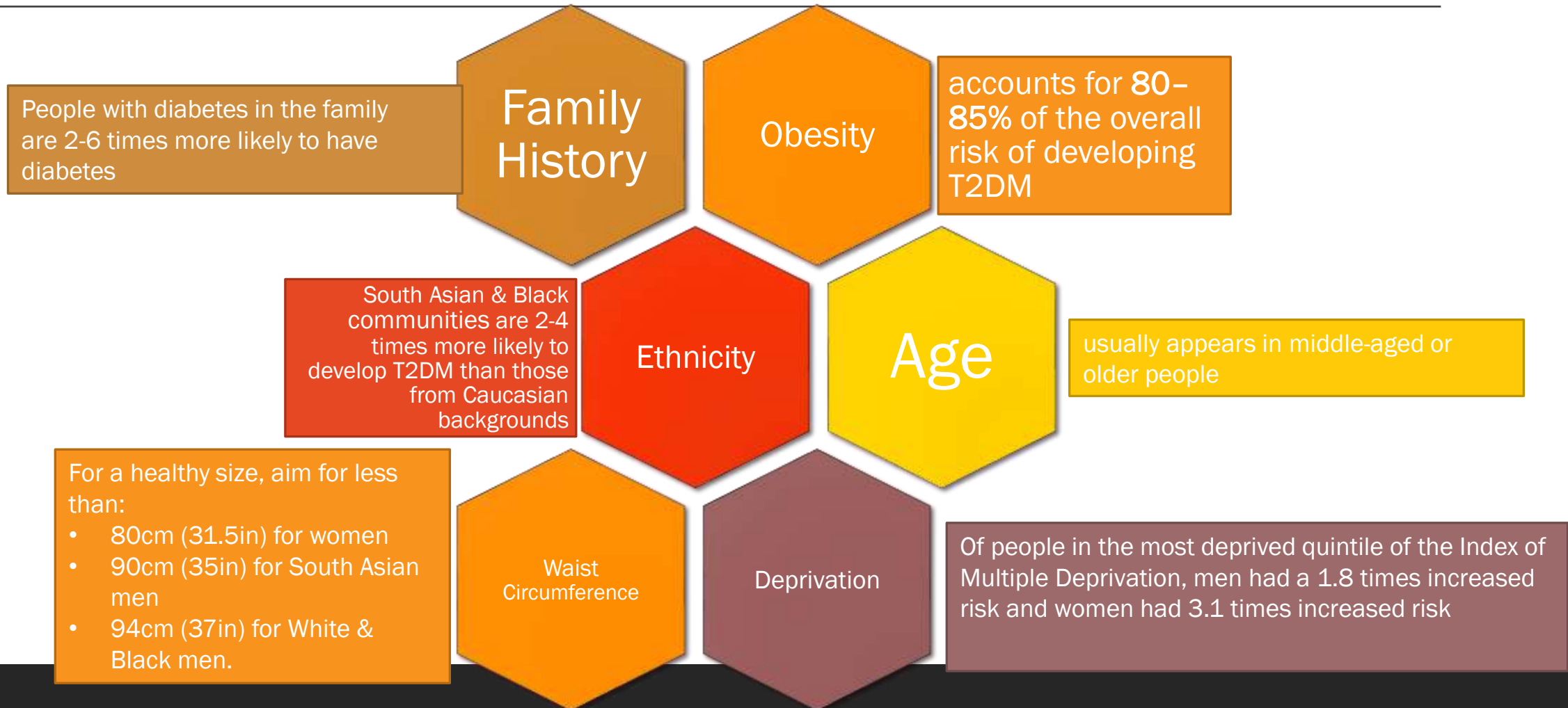
Erectile dysfunction

- Commonest complication of diabetes (in men); 30-95% prevalence in studies

Financial implications

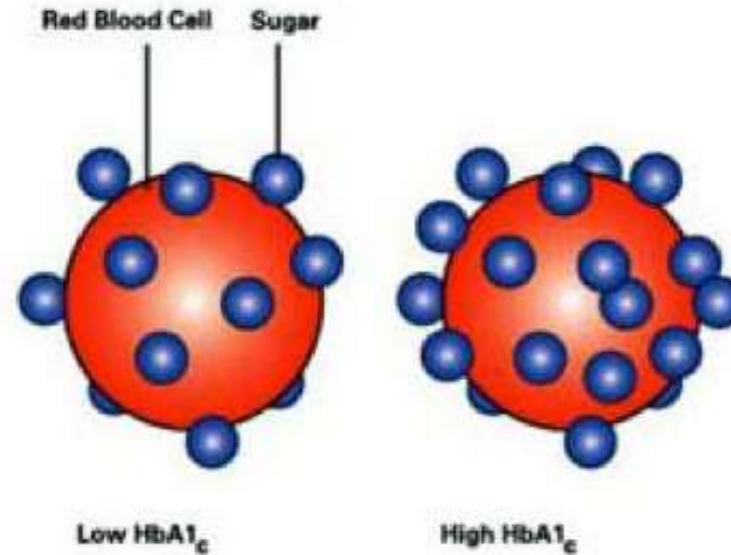
- About £10 billion/year is spent by the NHS on diabetes. (10% NHS budget)
 - This works out at around:
 - £27 million a day
 - £315 a second.
- The total cost (direct care & indirect costs) associated with diabetes in the UK currently stands at £23.7 billion and is predicted to rise to £39.8 billion by 2035/6
- 1 in 7 hospital beds is occupied by someone who has diabetes.
 - One fifth of hospital admissions for heart failure, heart attack and stroke are in people with diabetes
- 42.2 million prescription items were dispensed across England in 2012 at a net ingredient cost of nearly £768 million.

T2DM Risk Factors

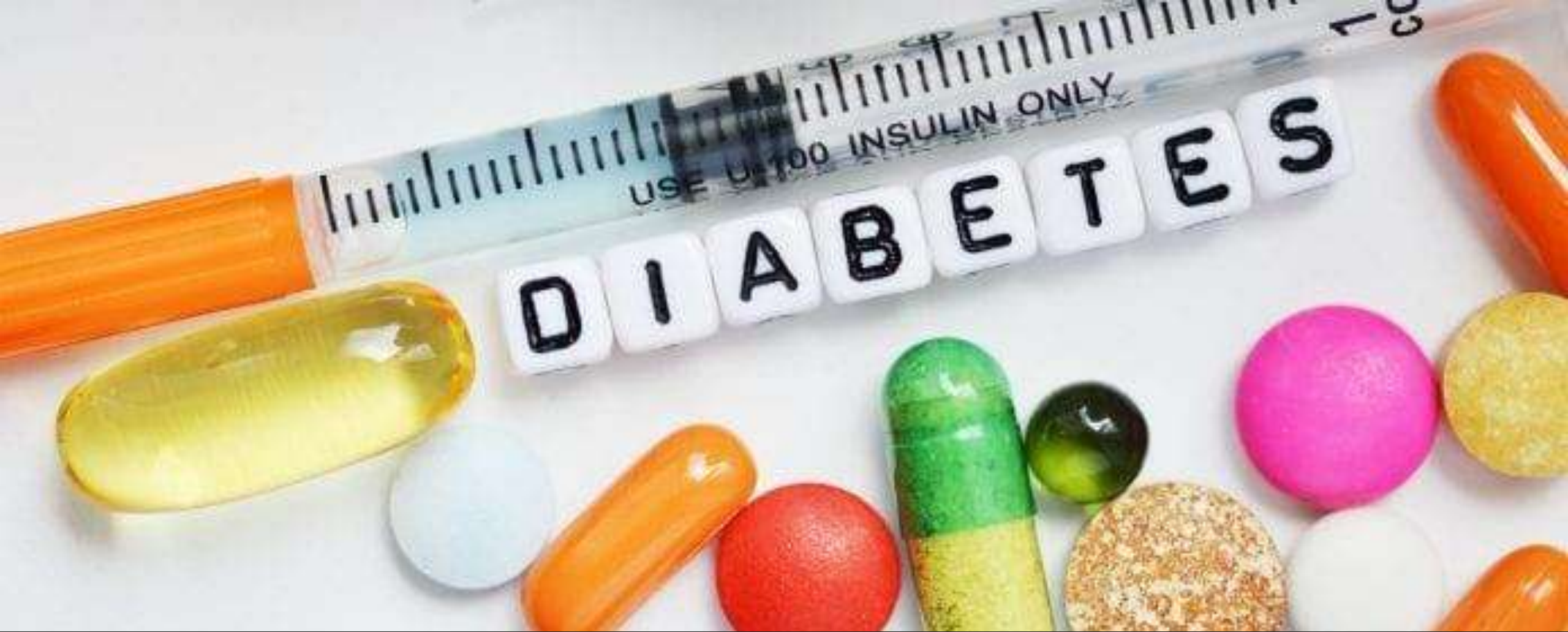


HbA1c & Diagnosis

Type 2 Diabetes		
Symptomatic		Asymptomatic
Fasting glucose >7 Random glucose >11.1		Any two of: FBG >7 RBG >11.1 HbA1c >48
Impaired Fasting Glucose	Pre-diabetes	Impaired Glucose Tolerance
FBG 6.1-6.9	HbA1c 42-47	



Bolton	Diabetes	Pre-Diabetes	Normal
HbA1c (IFCC-HbA1c (mmol/mol)	≥48	39-47	<39



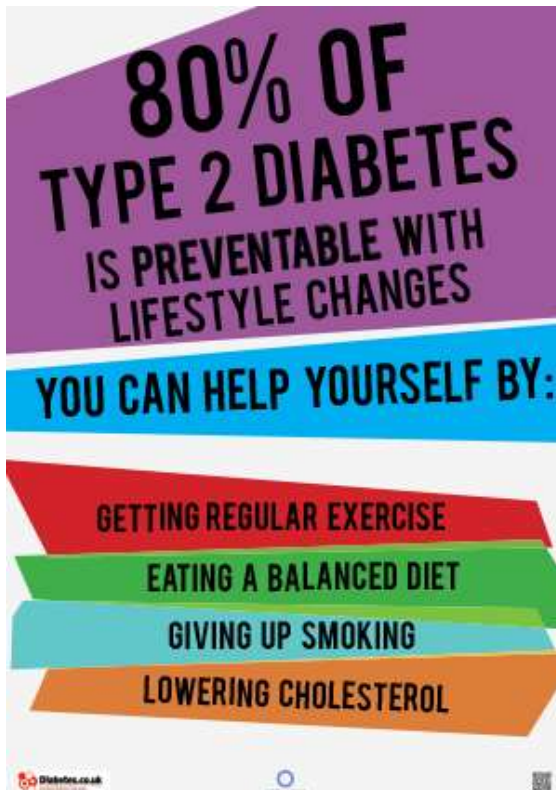
Treatment of Type 2 Diabetes

Management of Type 2 Diabetes

- Practice Nurses
- (aka “Clinical Nurse Specialists in Chronic Disease”)
 - Lifestyle Advice
 - Monitoring
 - Medication
 - Reviews



Lifestyle Advice

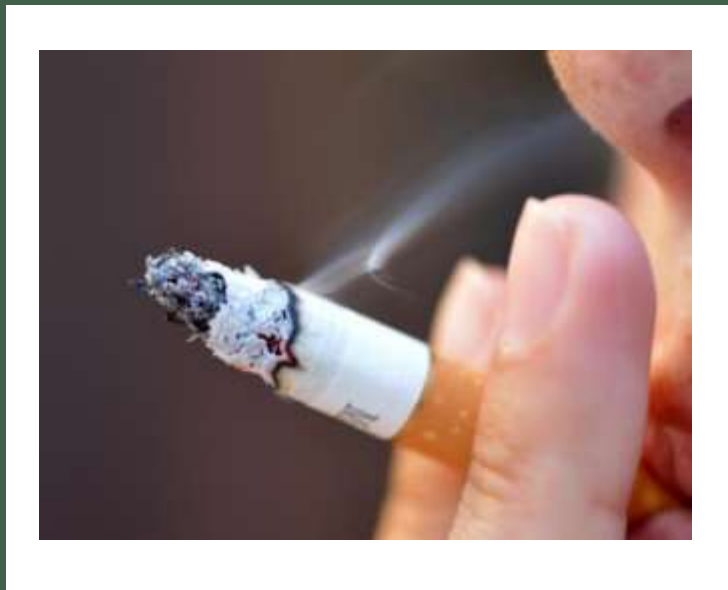


Weight

- A healthy BMI range is between 18.5 - 24.9 (18.5 - 22.9 for people of South Asian descent)
- For those with a BMI above the healthy range, NICE recommends aiming to achieve weight loss gradually, with a target to reduce weight by 5 to 10% over a period of a year.

Diet

- decrease intakes of fat and increase intake of dietary fibre.
- People who are currently overweight are advised to eat smaller portions to consume fewer calories.



MEAL DEAL



148kcal



284kcal



96kcal



120kcal

How many calories?



Very low calorie diets

Health

Shake diet offered on NHS to fight type 2 diabetes

🕒 1 September 2020

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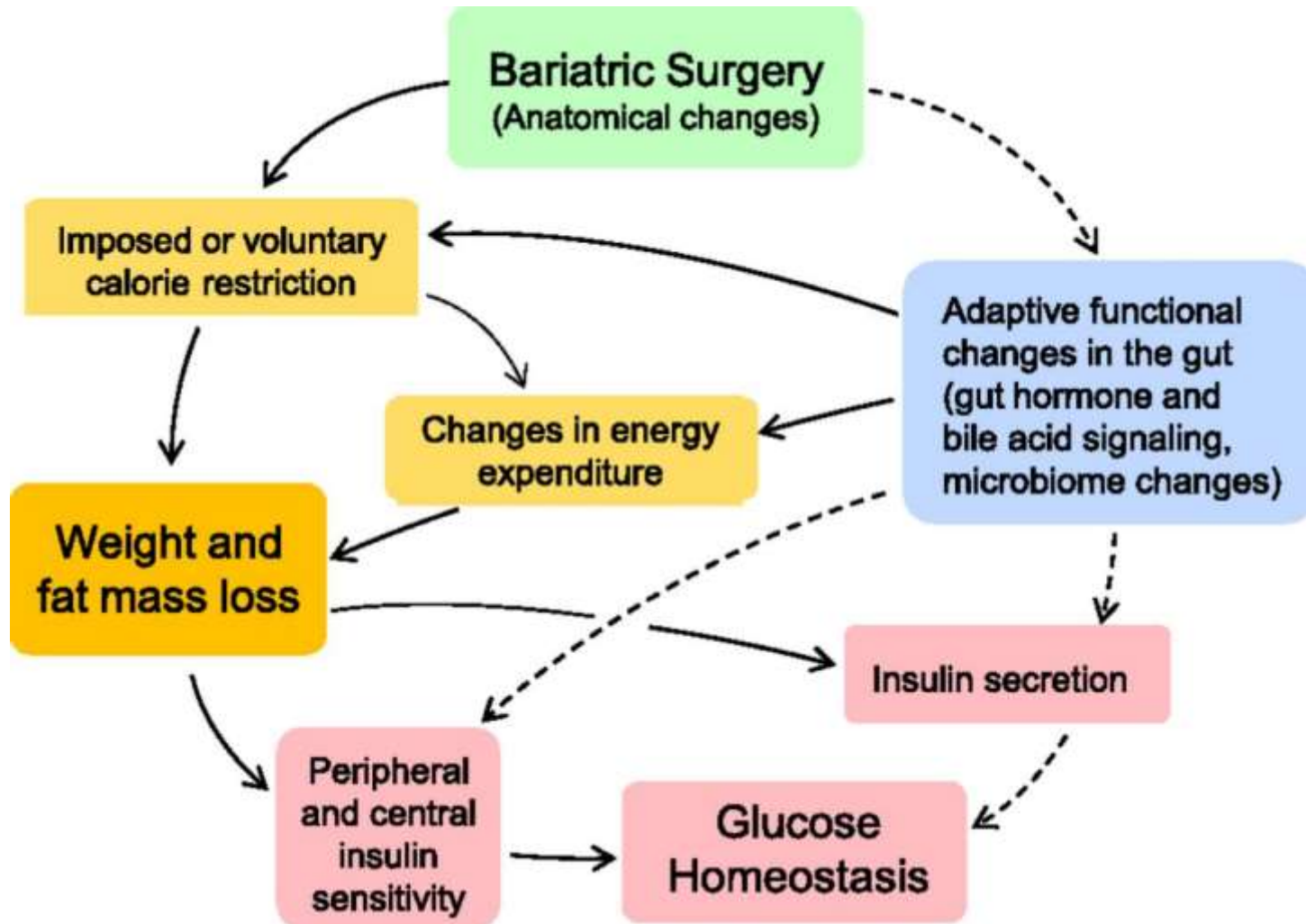


Thousands more people in England with type 2 diabetes will be offered the chance to try a soup-and-shake diet weight-loss plan for free on the NHS.

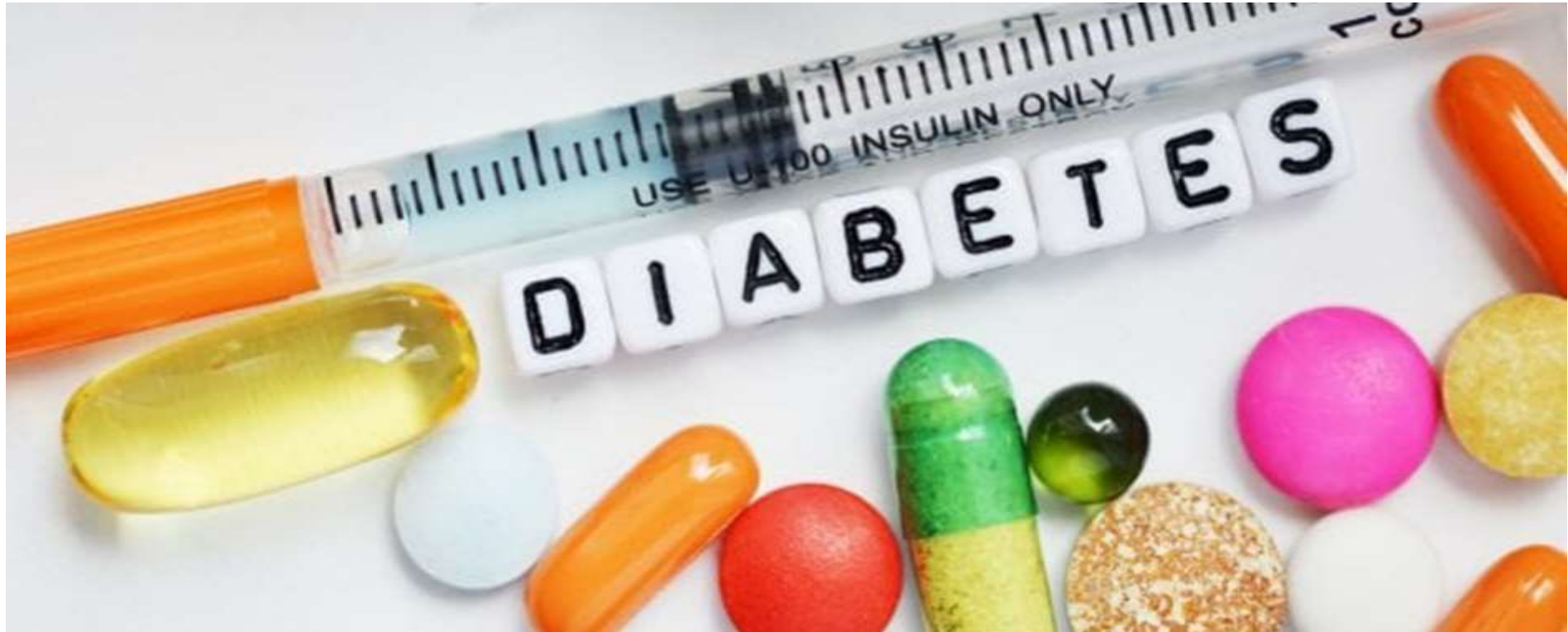
Studies show switching to the low-calorie liquid diet can put diabetes into remission.

Experts say they want to help people to be as fit as possible, particularly during the coronavirus pandemic.

Obesity and type 2 diabetes are linked and both increase the risk of complications from Covid-19.



Bariatric Surgery



Anti-diabetic Drugs



Metformin

First-line treatment

Effective

- suppresses hepatic gluconeogenesis
- increases insulin sensitivity
- enhances peripheral glucose uptake
- decreases absorption of glucose from the gastrointestinal tract

Side effects

- Gastrointestinal
 - Titrate slowly upwards
- Lactic Acidosis
 - Withhold when risk of dehydration

So Metformin. And then...?

	SU	PIO	DPP4	SGLT2	GLP1	Insulin
Efficacy	High	High	Intermediate	Intermediate	High	Highest
Hypo Risk	Moderate	Low	Low	Low	Low	High
Weight	↑	↑	↔	↓	↓	↑
Side Effects	hypo	Oedema, HF, ?bladder cancer	rare	GU, DKA	GI	hypo
Costs	£	£	£££	£££	£££	£-£££
Renal	eGFR >15	Not dialysis	Dose adjust	eGFR >60*	eGFR >30	Dose adjust
Examples	Gliclazide Glimepiride	Pioglitazone	Alogliptin Linagliptn	Canagliflozin Empagliflozin	Semaglutide Dulaglutide	Lots!

Sulphonyureas

Gliclazide/Glimepiride

Cheap*

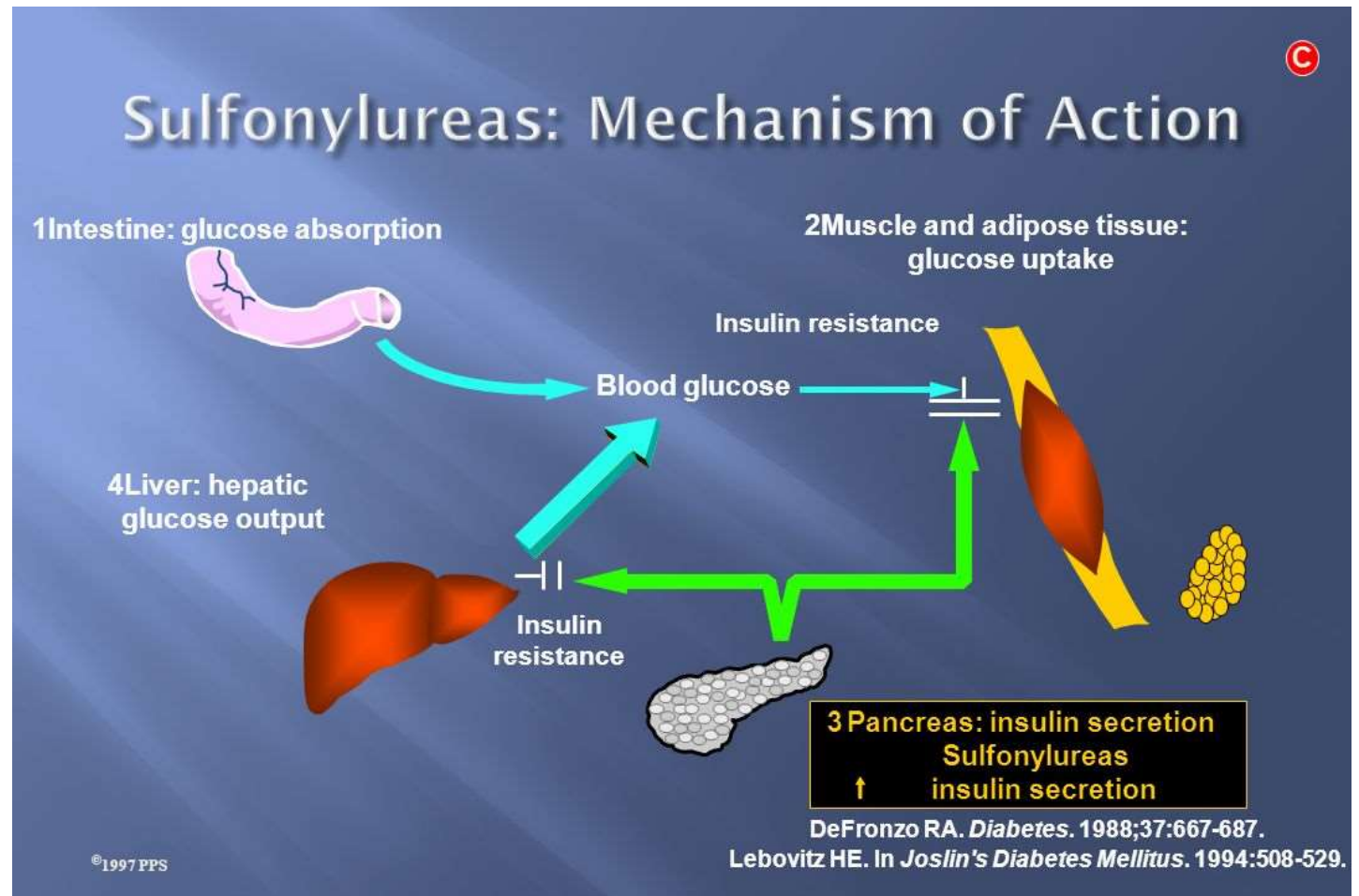
Risk of hypos*

Common

Weight gain

Quick response

*so needs monitoring equipment



Pioglitazone

Insulin sensitiser

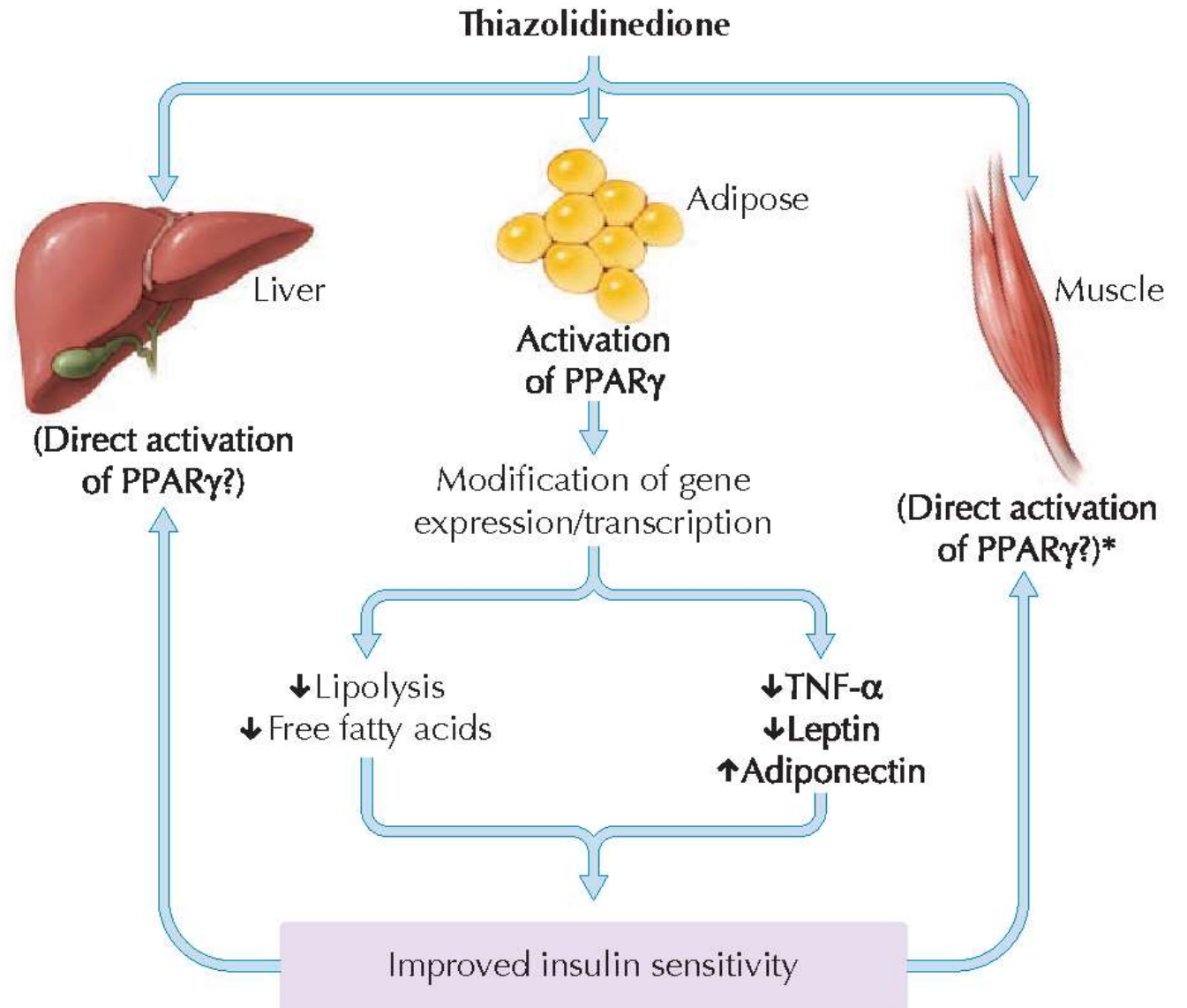
Tends to encourage weight gain

Low cost

Well tolerated

Some hypoglycaemia risk

Worries about heart failure with others in class, and ?risk of bladder cancer



DPP4- inhibitors

Gliptins

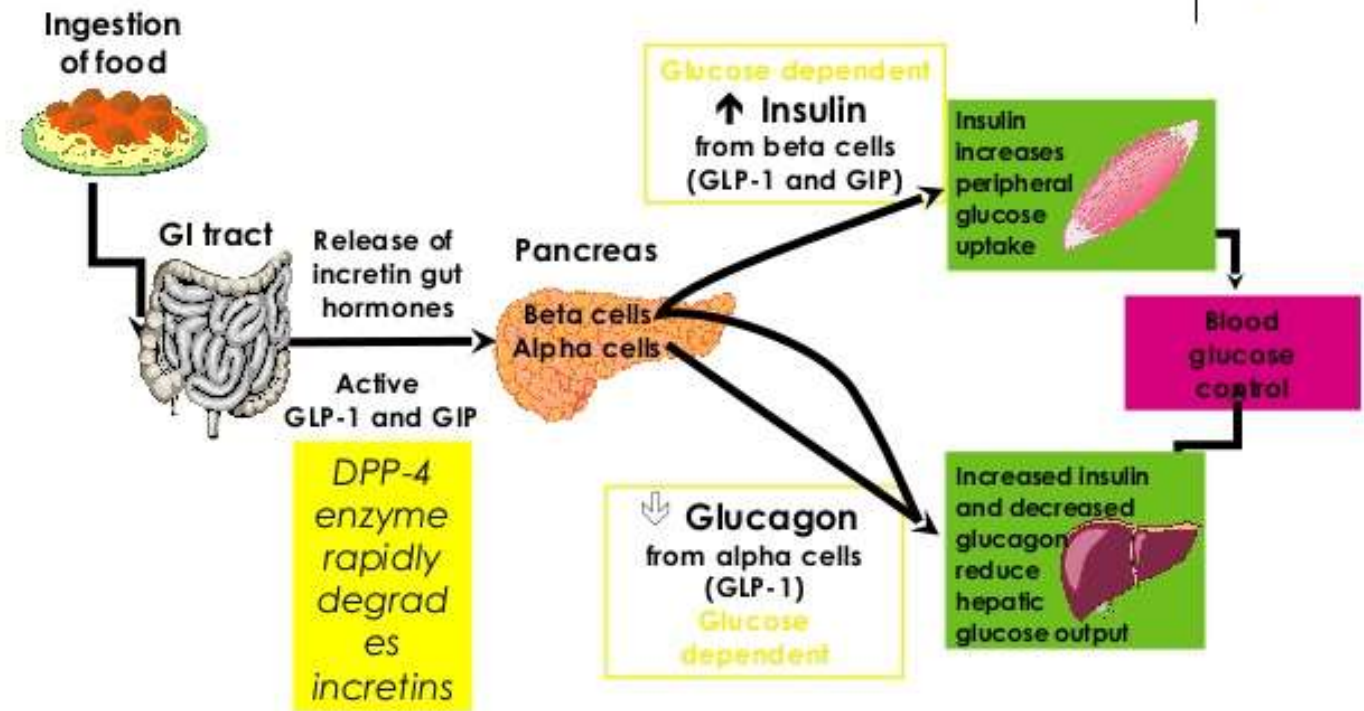
High cost

Minimal side effects

Low/no hypos

Efficacy is ok

Incretins and glycemic control



Adapted from 7. Drucker DJ. *Cell Metab.* 2006;3:153-165. 8. Miller S, St Onge EL. *Ann Pharmacother* 2006;40:1336-1343.

SGLT2 inhibitors

Flozins

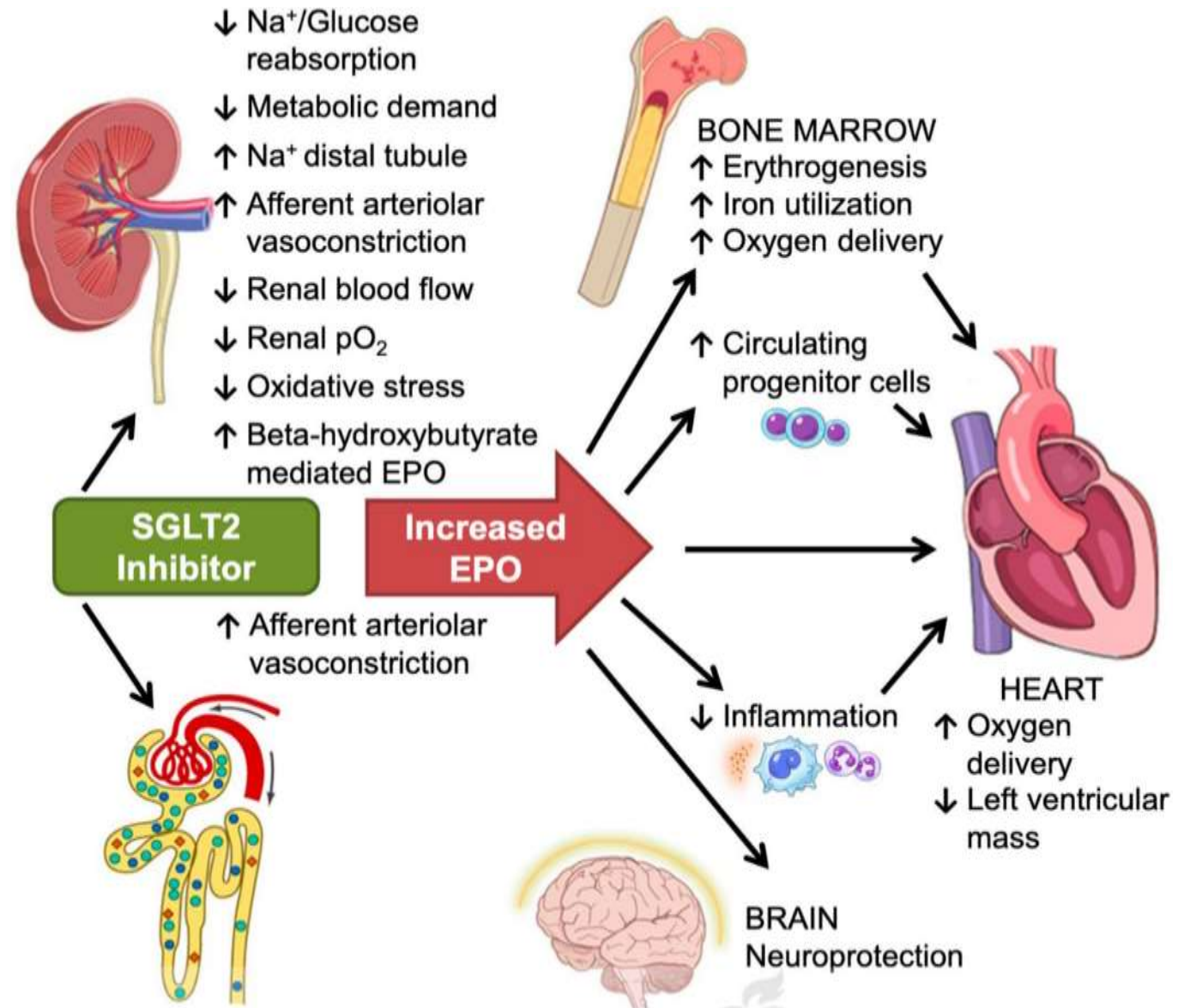
Proven ASCVD benefit

Good in diabetic kidney disease

High cost

High efficacy

Side effects list is a bit scary



GLP-1

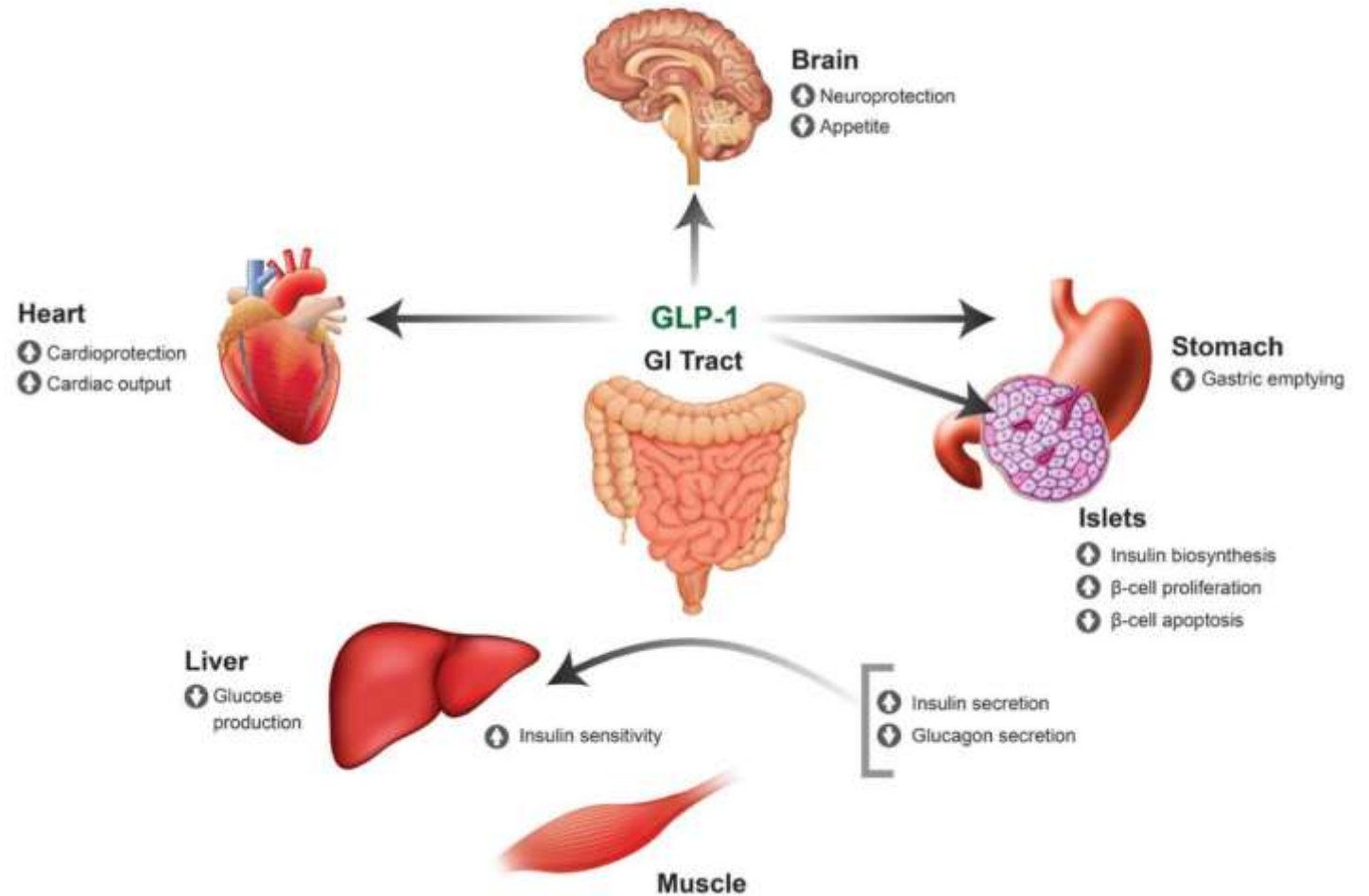
-glutide injections

Weekly SC dose

GI side effects

Weight loss common

AVSCD protective



GLP-1

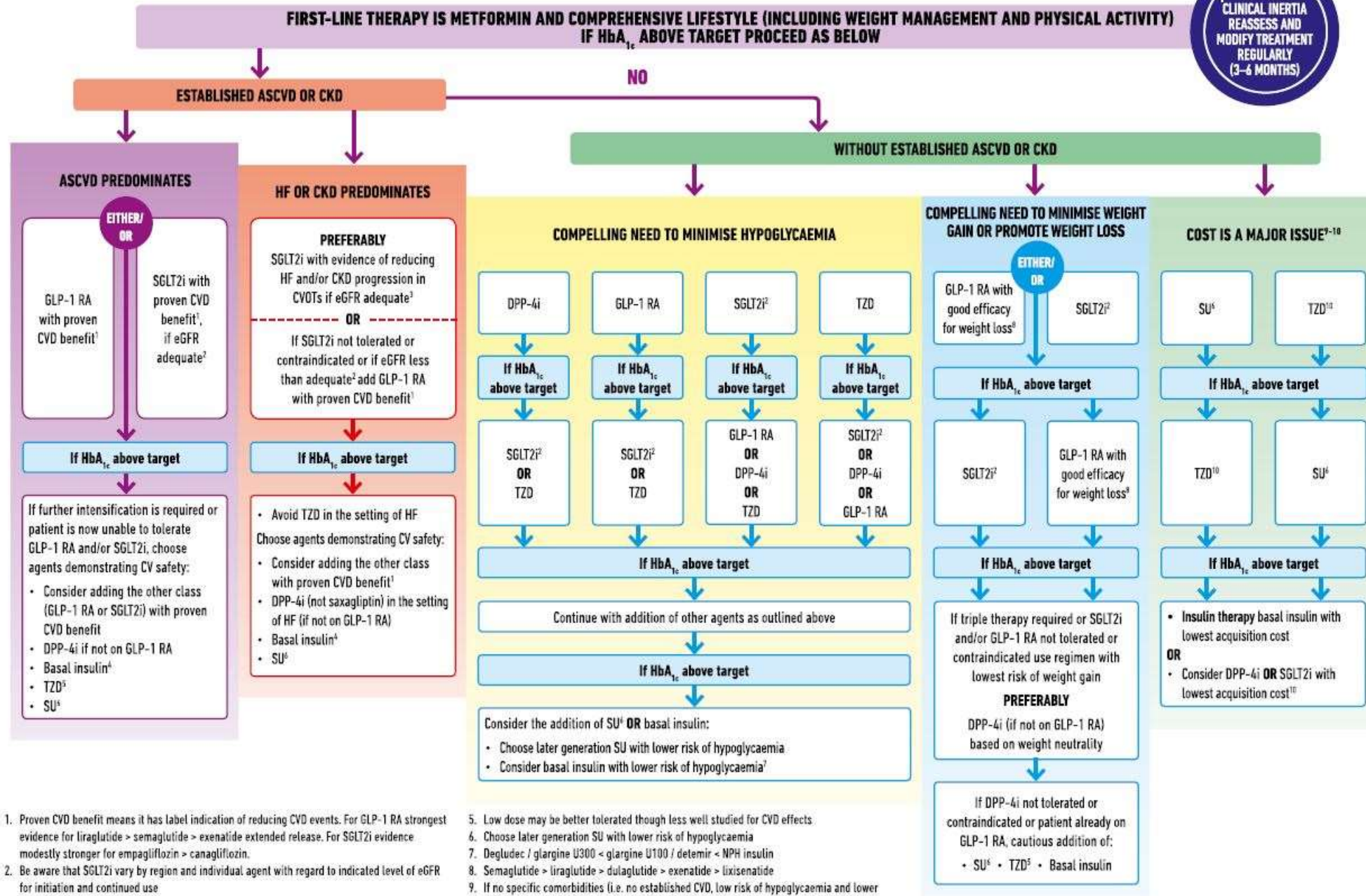
Devices



What medicine
should you choose
after metformin?

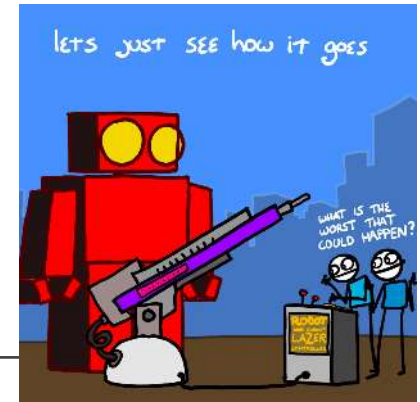
GLUCOSE-LOWERING MEDICATION IN TYPE 2 DIABETES: OVERALL APPROACH

TO AVOID CLINICAL INERTIA REASSESS AND MODIFY TREATMENT REGULARLY (3-6 MONTHS)



1. Proven CVD benefit means it has label indication of reducing CVD events. For GLP-1 RA strongest evidence for liraglutide > semaglutide > exenatide extended release. For SGLT2i evidence modestly stronger for empagliflozin > canagliflozin.
 2. Be aware that SGLT2i vary by region and individual agent with regard to indicated level of eGFR for initiation and continued use
 3. Both empagliflozin and canagliflozin have shown reduction in HF and reduction in CKD progression in CVOTs
 4. Degludec or U100 glargine have demonstrated CVD safety

5. Low dose may be better tolerated though less well studied for CVD effects
 6. Choose later generation SU with lower risk of hypoglycaemia
 7. Degludec / glargine U300 < glargine U100 / detemir < NPH insulin
 8. Semaglutide > liraglutide > dulaglutide > exenatide > lixisenatide
 9. If no specific comorbidities (i.e. no established CVD, low risk of hypoglycaemia and lower priority to avoid weight gain or no weight-related comorbidities)
 10. Consider country- and region-specific cost of drugs. In some countries TZDs relatively more expensive and DPP-4i relatively cheaper



Treatment intensification

Clinical inertia may contribute to people with T2DM living with suboptimal glycaemic control for many years.

Measure HbA1c every 3-6 months

If HbA1c levels are not well controlled with single-drug treatment, it is important to offer intensification of drug treatment, as well as lifestyle support, to aim for an HbA1c level of 53 mmol/mol.

A timescale of 6 months allows time to improve diet, lifestyle and adherence to drug treatment, while also ensuring that first intensification is not unnecessarily delayed.

Timely first intensification can delay the need for second intensification, which may involve insulin therapy.



SIGN say BP 130/80



NICE:

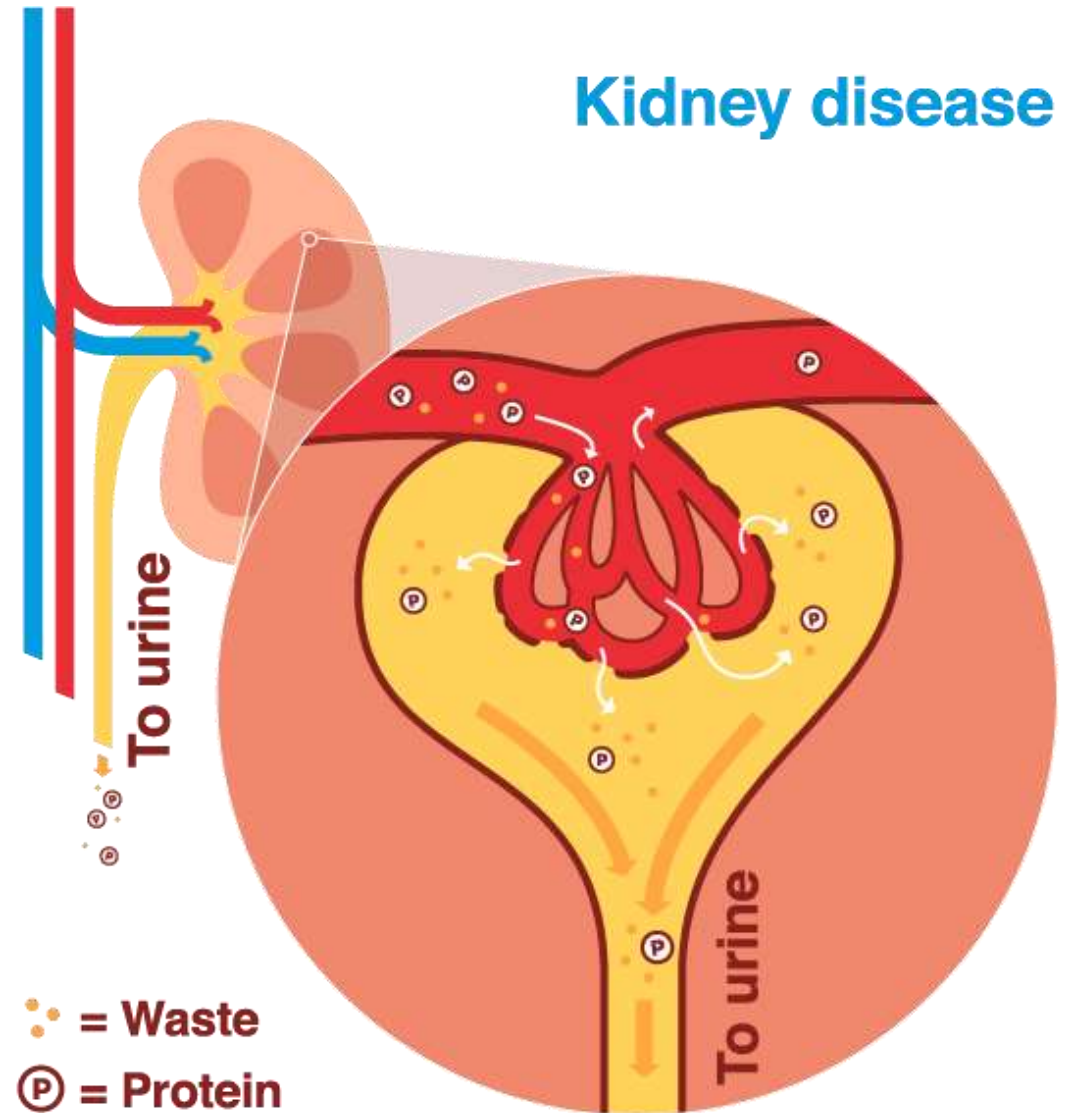
Aged <80 aim for clinic BP <140/90 mmHg and over 80 aim for 150/90 mmHg and maintain that level.

Managing ASCVD

Diabetic Kidney Disease

Almost one in five people with diabetes will need treatment for diabetic nephropathy.

Diabetes is the most common cause of ERF requiring RRT



Annual Check

BP

Weight

Eyes

Feet

HbA1c

eGFR

Albumin : Creatinine Ratio

Lipids

Management of Pre- diabetes

- Key messages for patients
 - Pre-diabetes is a serious warning sign for developing diabetes and consequent cardiovascular disease risk
 - Risks are preventable
 - Lifestyle changes are key
- Annual HbA1c
- Review other risk factors
- Consider weight management +/- orlistat
- Consider metformin if lifestyle change not possible/effective and rising HbA1c

Diabetes Summary

This. Is. Serious.

Think about & look for complications

HbA1c >48

Metformin

Review and intensify treatment if needed

Choose add-on agents based on patient needs

Case Studies

Brian, 50



HbA1c = 59 (previously 49 then 54)

eGFR = 78

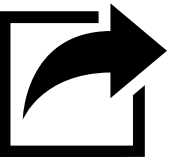
ACR <3

BP 148/90

BMI 30.2

HGV Driver

Currently taking 1g metformin BD



Asha, 61



HbA1c = 64 (previously 58 then 54)

eGFR = 63

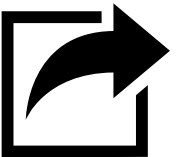
ACR 5

BP 154/96

BMI 26

Teacher

Currently taking metformin 1g BD, Linagliptin 5mg, Glimepiride 4mg, Amlodipine 5mg, Atorvastatin 40mg daily



Eliza, 21

HbA1c = 96

eGFR = >90

ACR not known, dipstick shows glucose ++++ and protein +

BP 96/60

BMI 13

Student

No regular medications. Family history of diabetes.

