

# PROVIDING UP TO DATE CARE FOR PEOPLE WITH DIABETES

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# WHAT IS DIABETES?

'A metabolic disease with hyperglycaemia resulting from defects in insulin secretion or insufficient insulin or insulin action for the body's need'

- NSF

- nGMS

- NICE

# MAIN TYPES OF DIABETES

## TYPE 1

- Approx 15% of Diabetes
- Autoimmune disease that destroys beta cells in the pancreas
- Usually children/young adults

## TYPE 2

- Approx 85% of Diabetes
- Insulin deficiency/ Insulin resistance
- Strong link with obesity
- No longer only 'a disease of the middle aged/ elderly'

# GENETIC VARIATIONS

## **MODY (Maturity Onset Diabetes of the Young)**

- Diabetes before age of 25 yrs
- Accounts for 1-2% of Diabetes
- Runs in families
- Rx diet/ tablets (Sulphonylureas) usually not requiring insulin

## **LADA (Latent Autoimmune Diabetes of Adulthood)**

- A slowly progressing auto-immune form of Diabetes
- Also known as T1.5DM
- Occurs at any age
- Often masquerades as T2DM

# WHY SHOULD WE BE CONCERNED?



- Worldwide 171 million- predicted 366 million by 2030
- Accounts for 8% of total NHS expenditure
- Most common cause of blindness in adults
- Accounts for half of all lower limb amputations
- Single largest cause of renal failure

# CARDIOVASCULAR RISK

**‘The risk of developing cardiovascular disease, which is a combination of the risks for developing CHD, cerebrovascular and peripheral vascular disease’**

- Risk of CVA increased 2 fold
- Risk of CVD increased 2-3 fold in men & 4-5 fold in women

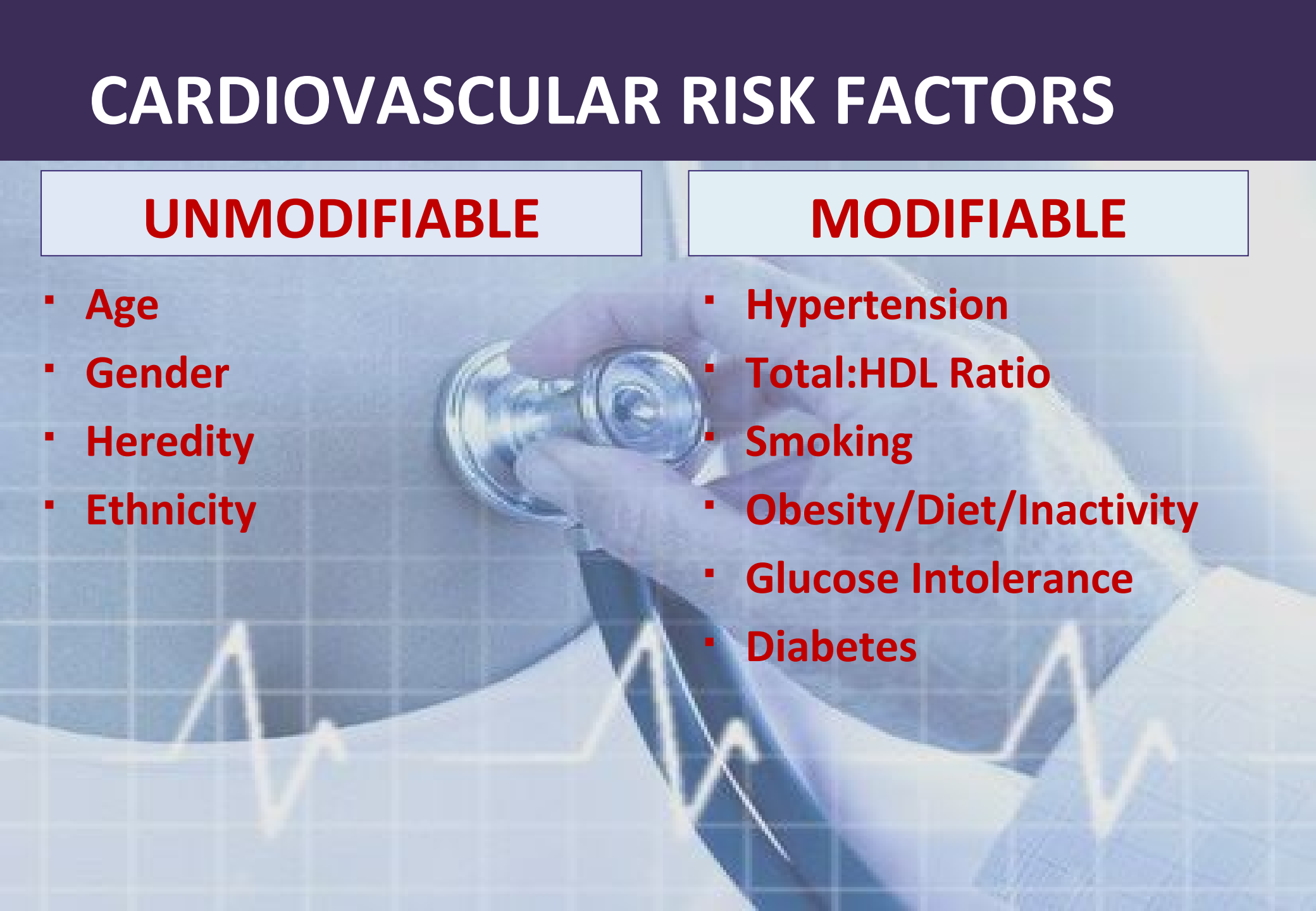
# CARDIOVASCULAR RISK FACTORS

## UNMODIFIABLE

- Age
- Gender
- Heredity
- Ethnicity

## MODIFIABLE

- Hypertension
- Total:HDL Ratio
- Smoking
- Obesity/Diet/Inactivity
- Glucose Intolerance
- Diabetes



# RISK FACTORS- T2DM

- Aging
- Family History
- Ethnicity
- Gestational Diabetes
- PCOS

- IGT/IFG
- Obesity
- Sedentary lifestyle
- Hypertension
- Dyslipidaemia



# METABOLIC SYNDROME (IDF)

## CLUSTER OF RISK FACTORS FOR CVD, T2DM & LIVER DISEASE

### CENTRAL OBESITY

Waist circumference:

Europeans- Men  $\geq 94$ cm, Women  $\geq 80$ cm

S. Asians- men  $\geq 90$ cm, Women  $\geq 80$ cm

### FASTING BLOOD GLUCOSE

$> 5.6$  mmol/l or previously diagnosed T2DM

### BLOOD PRESSURE

$\geq 130/65$  or receiving treatment

### TRIGLYCERIDES (FASTING)

$\geq 1.7$  mmol/l or receiving specific treatment

### HDL CHOLESTEROL

Men  $< 1$ mmol/l

Women  $< 1.3$  mmol/l or receiving specific treatment

# ORAL GLUCOSE TOLERANCE TEST

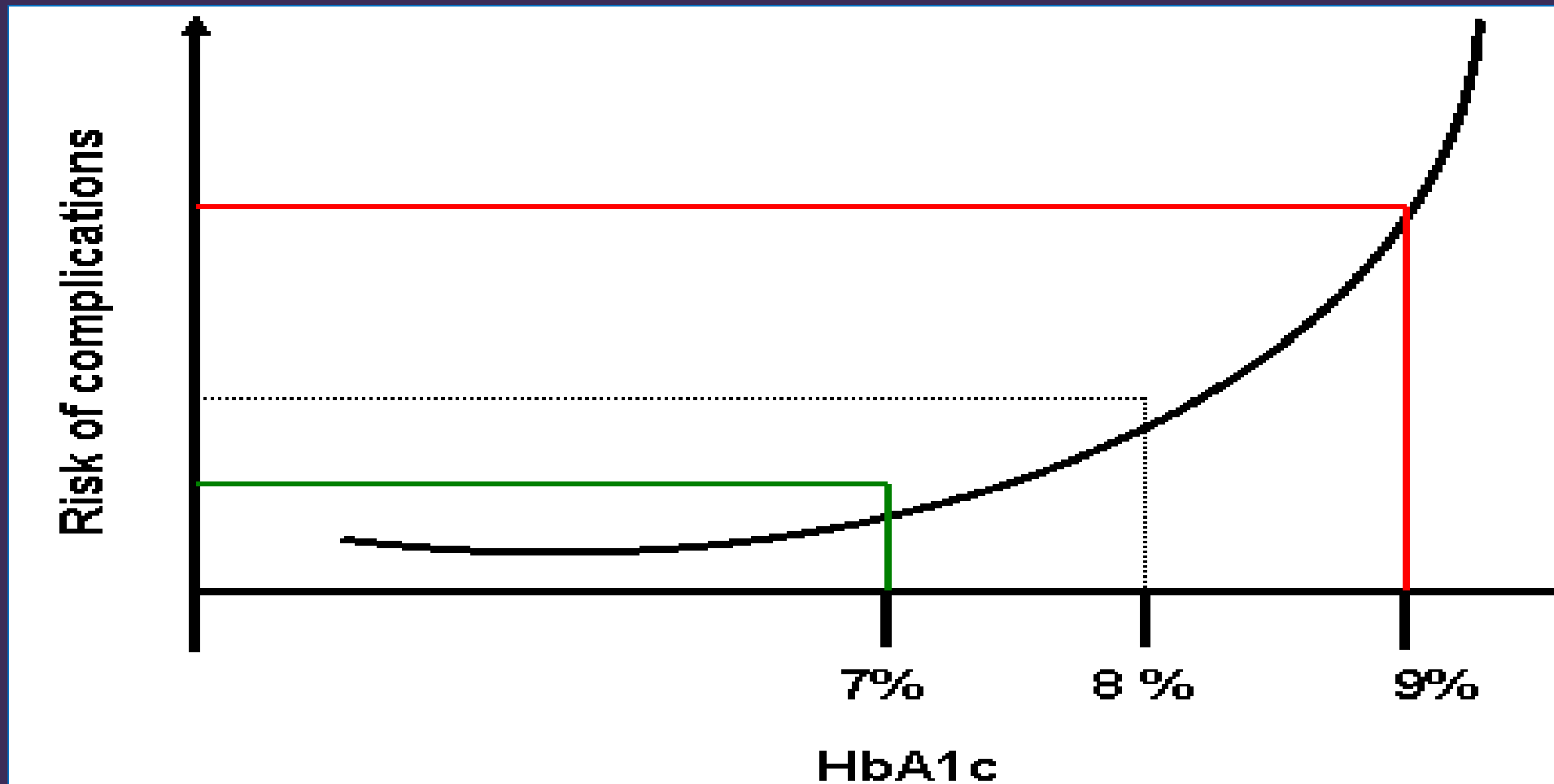
DIABETES MELLITUS	FBG $\geq 7.0$ mmol/l <u>OR</u> 2-hour OGTT $\geq 11.1$ mmol/l
IMPAIRED GLUCOSE TOLERANCE (IGT) <b>UP TO 50% PROGRESS TO T2DM IN 2 YEARS</b>	FBG $< 7$ mmol/l <u>AND</u> 2-hour OGTT plasma venous glucose $\geq 7.8$ mmol/l and $< 11.1$ mmol/l
IMPAIRED FASTING GLUCOSE (IFG) <b>INCREASED RISK OF T2DM &amp; CVD</b>	FBG 6.1–6.9 mmol/l <u>AND</u> 2-hour OGTT plasma venous glucose $< 7.8$ mmol/l

**10% WEIGHT LOSS REDUCES RISK  
OF T2DM BY 60%**

# HbA1c

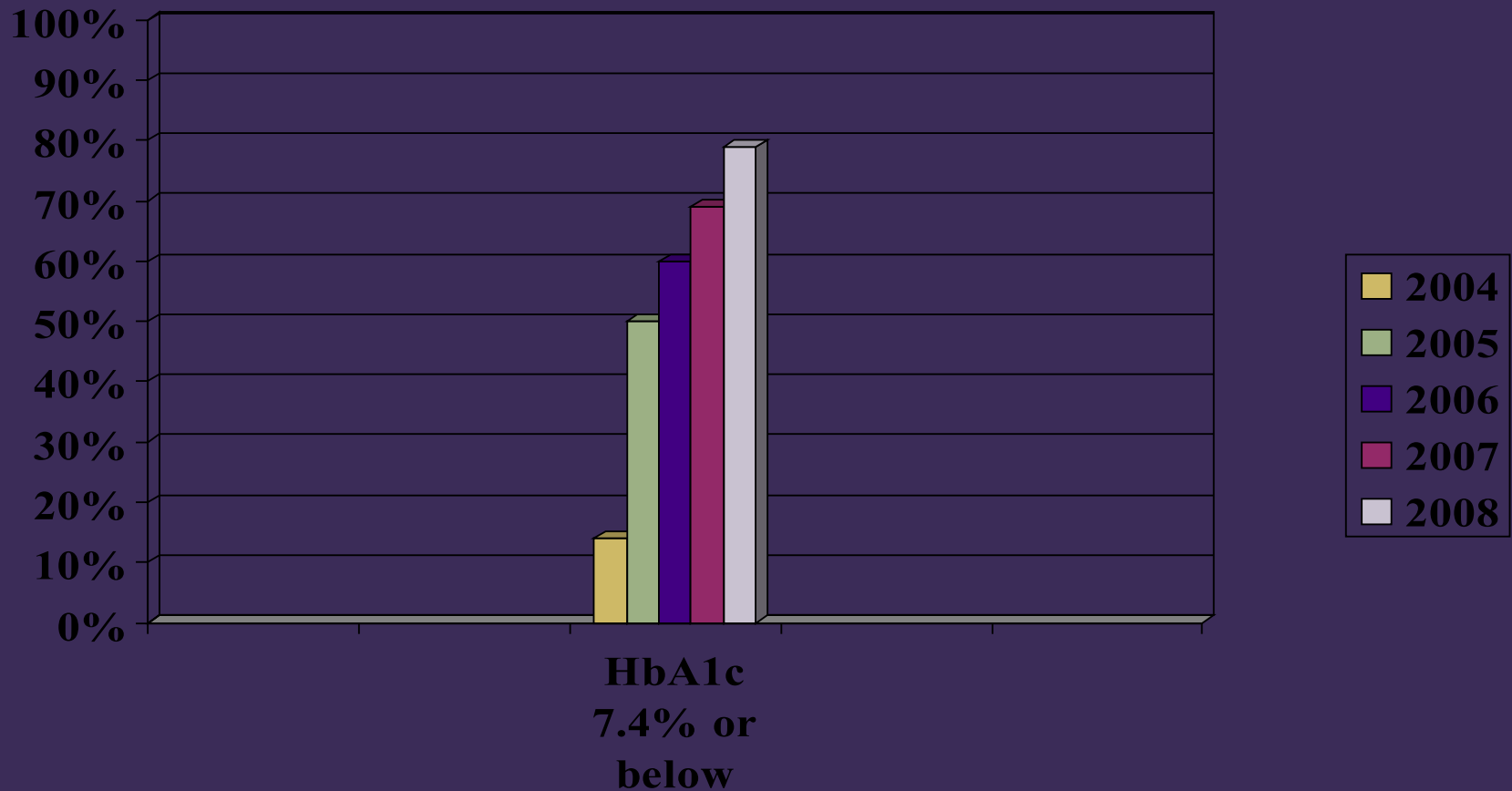
<b>HbA1c (%)</b>	<b>AVERAGE BLOOD GLUCOSE (mmol/l)</b>
<b>13</b>	<b>18</b>
<b>12</b>	<b>17</b>
<b>11</b>	<b>16</b>
<b>10</b>	<b>13</b>
<b>9</b>	<b>12</b>
<b>8</b>	<b>10</b>
<b>7</b>	<b>8</b>
<b>6</b>	<b>7</b>

# EFFECT OF POOR GLYCAEMIC CONTROL



# DIABETES OUTCOMES

## MANOR SURGERY



# LIFESTYLE

## Always the 1<sup>st</sup> line approach!

- Increasing activity
- Diet/Weight loss
- Alcohol
- Smoking

- Individual patient records
- Diabetes2gether
- Diabetes UK

- Assess level of motivation to change
- Set goal for next visit



# SMART GOALS

**S**pecific

**M**easurable

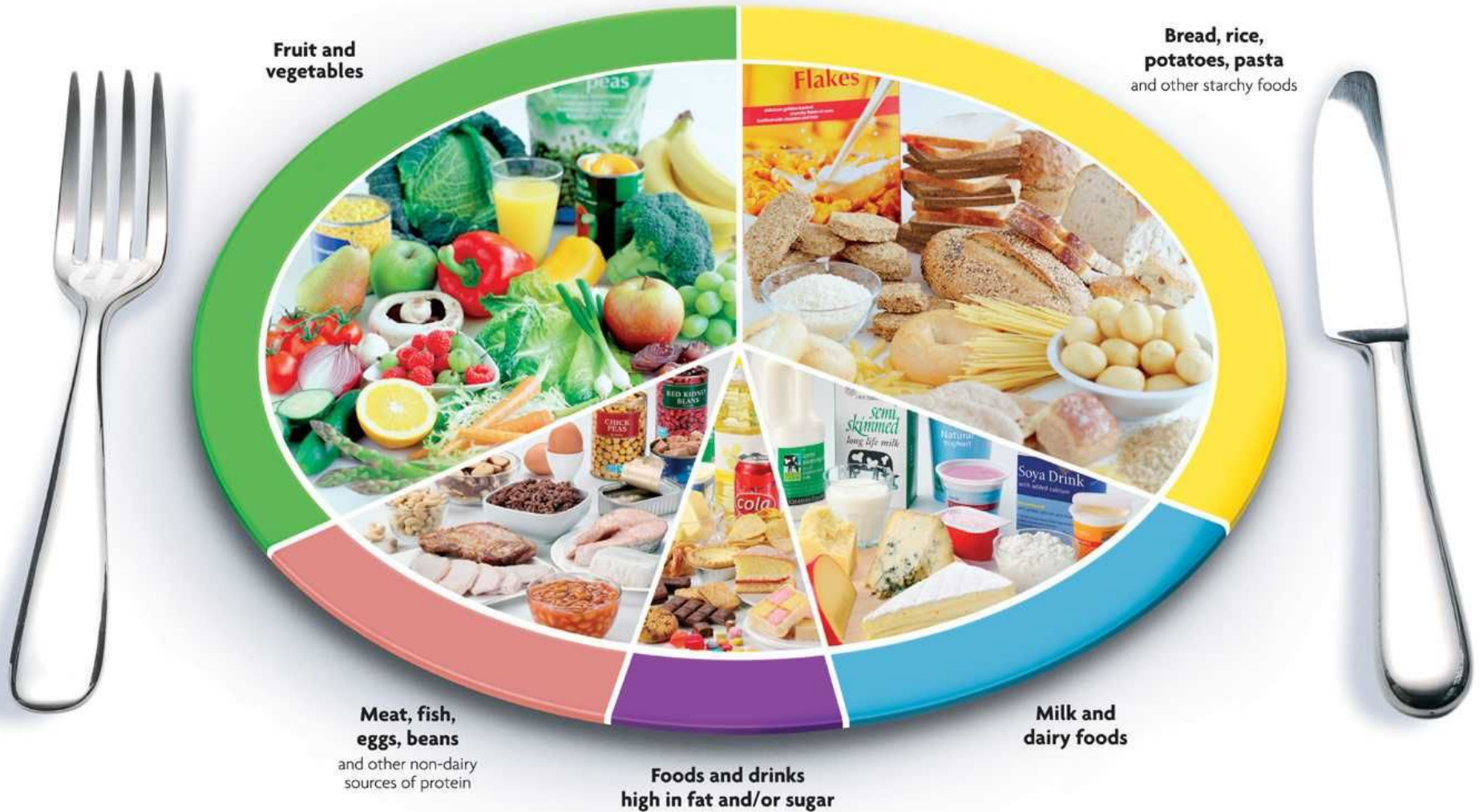
**A**ttainable

**R**ealistic

**T**imescale

# The eatwell plate

Use the eatwell plate to help you get the balance right. It shows how much of what you eat should come from each food group.



# ORAL TREATMENT-T2DM

## BIGUANIDES-METFORMIN

- Improves insulin sensitivity
- Cardio protective
- Weight neutral
- If tolerated increase dose over 1-3 mths to 2g/day
- Frequent GI effects -> try MR version



- **Beware Lactic Acidosis**
- **Review if plasma creatinine > 130 or eGF <45ml/min**
- **Stop if plasma creatinine > 150 or eGFR <30ml/min**

# ORAL TREATMENT-T2DM

## SULPHONYLUREAS

- Gliclazide-start 80mg od & increase monthly
- MR version as effective and provides better profile for elderly
- Weight gain
- Risk of hypoglycaemia
- Check LFTs



# ORAL TREATMENT-T2DM

## THIAZOLIDINEDIONES (TZDs)

Improve insulin sensitivity

Rosiglitazone- Increased risk of MI by 43% & HF by 60%

Pioglitazone- Reduced risk of death from MI/CVA by 5%.

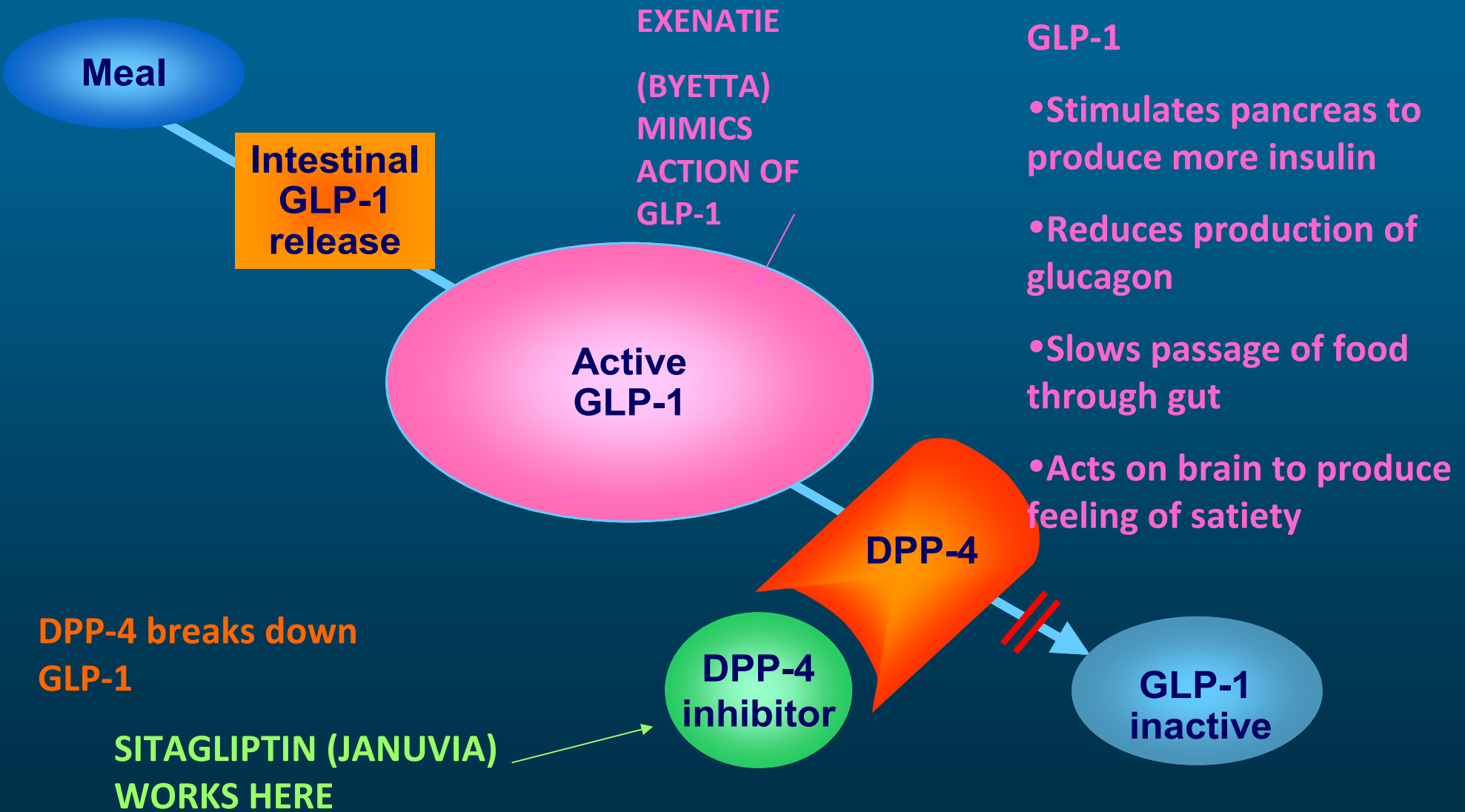
Improves lipid profile & reduces intracoronary risk

### CAUTIONS:

- Cause fluid retention
- Weight gain
- Expensive
- Increased risk long bone #



# NEW AGE OF INCRETIN MIMETIC DRUGS



# SITAGLIPTIN/VILDAGLIPTIN (DPP-4 Inhibitor)

- Use with Metformin/SU or Glitazone
- 100mg daily
- Possible nausea
- Associated weight loss
- Caution with renal impairment



# EXENATIDE (BYETTA)

(Mimics GLP-1)



## Consider as option only if:

- Body mass  $> 35$  (adjust for ethnic minorities) &
- Has HbA1c  $\geq 7.5\%$  on Metformin/SU &
- Would otherwise start high cost medication such as Glitazone or Insulin

- **Glitazones contraindicated**
- **S/E Nausea/vomiting**



# COST COMPARISON

<b>DRUG</b>	<b>MONTHLY COST-MAXIMUM DOSE</b>
Metformin	£6.40
Metformin MR (500mg tabs)	£12.80
Metformin/Pioglitazone	£35.54
Gliclazide	£2.24
Gliclazide MR	£12.24
Pioglitazone	£36.96
Sitagliptin	£33.26

# BLOOD GLUCOSE TESTING

“There is no evidence that blood glucose monitoring improves glycaemic control in people with T2DM not using insulin” (NICE, 2008)

- Costs account for 27% of total diabetes prescribing
- Patient ‘Empowerment’
- Should be used correctly
- Blood ketone testing



# NORMAL INSULIN PROFILES



**Breakfast**



**Lunch**



**Evening Meal**

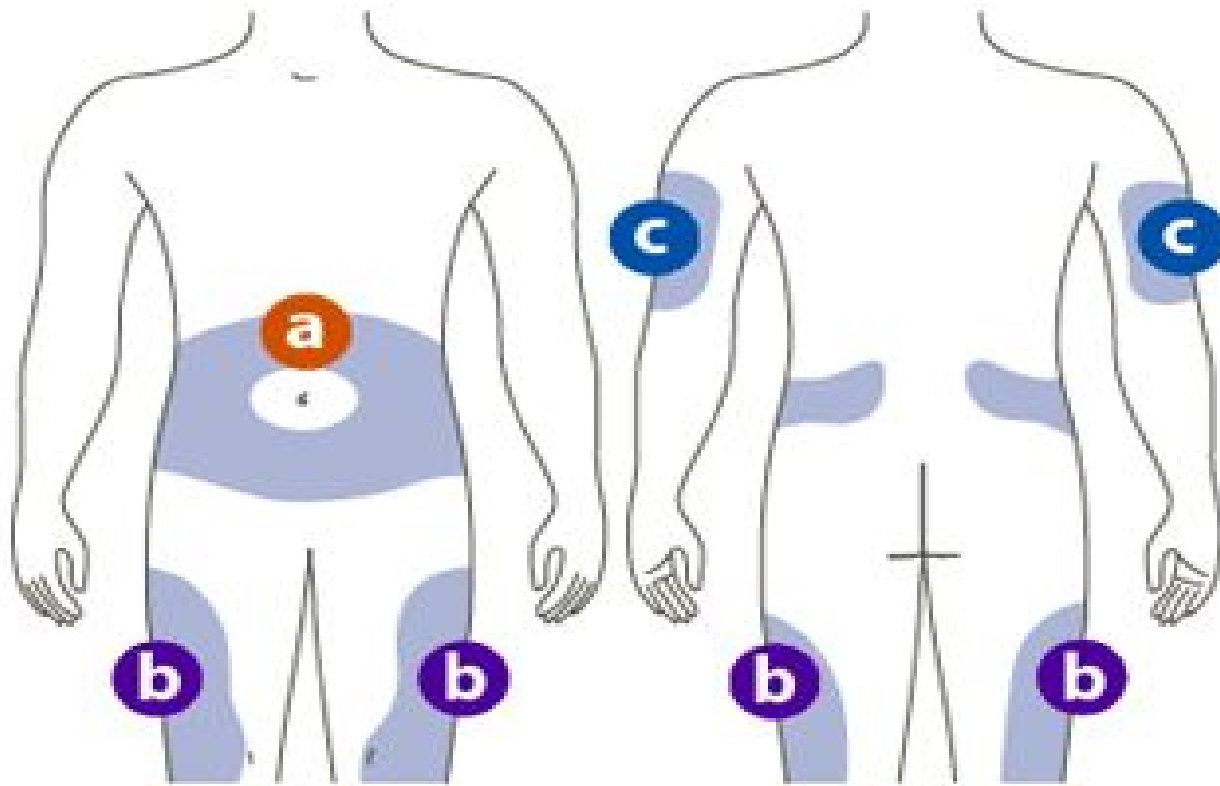


# INSULIN NEEDS TO:

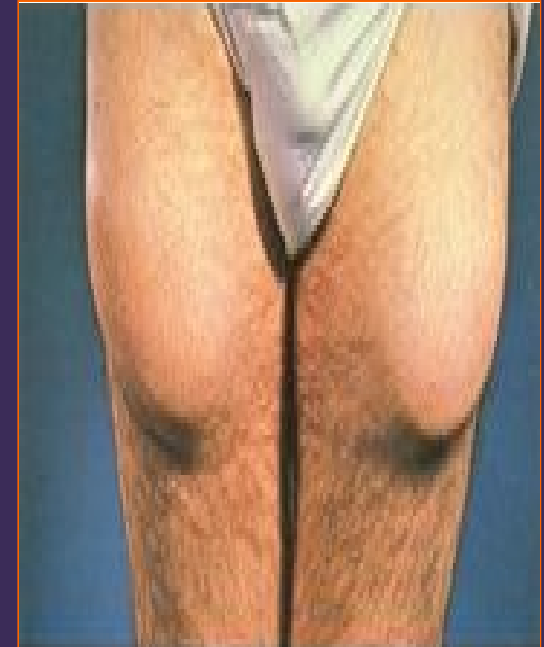
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- Replace the background (basal) insulin
- Replace the mealtime (bolus) insulin
- Replace both

# SITE ROTATION



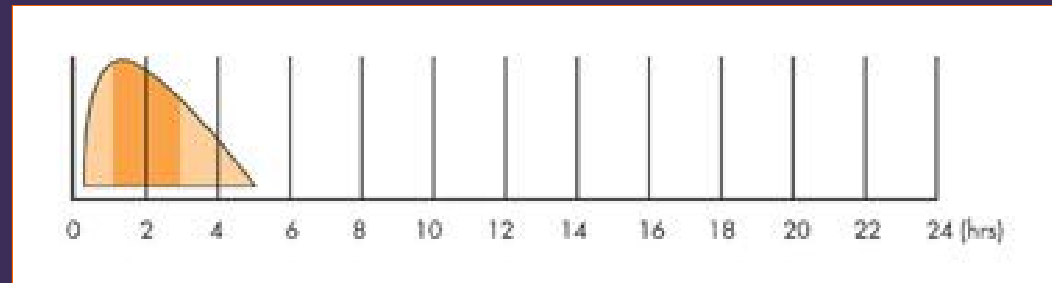
Recommended injection sites



# SHORT/RAPID ACTING

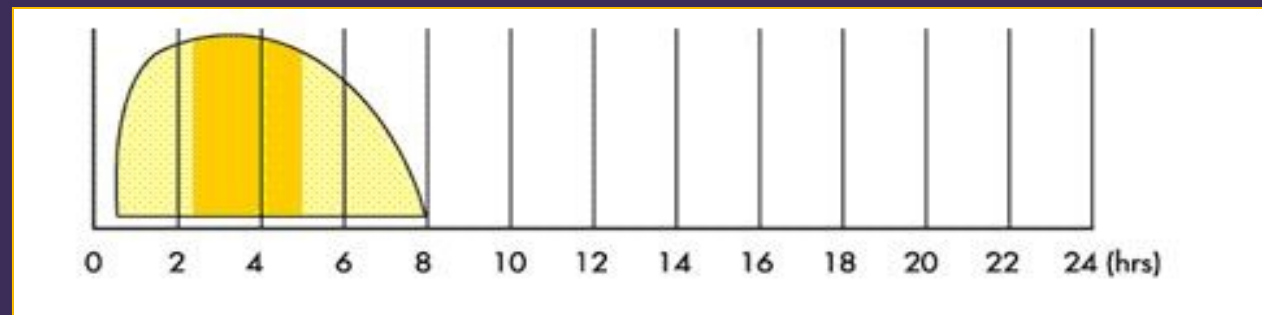
## Rapid acting:

- Novorapid or Humalog
- Onset-immediate
- Peak 1-2 hrs
- Duration 3-5 hrs



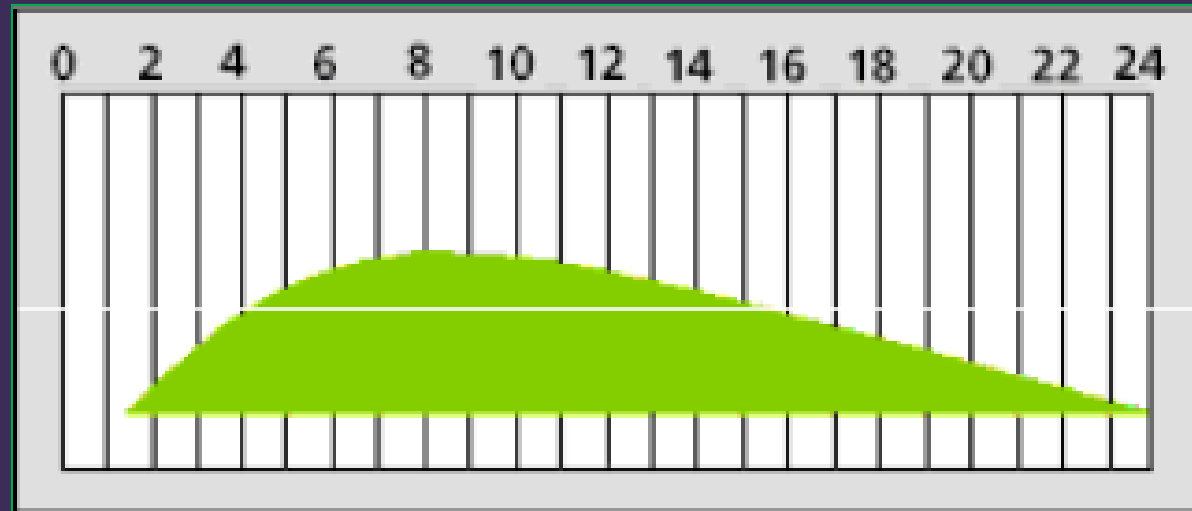
## Short acting:

- Humulin S
- Onset: 30mins
- Peak: 1-3 hrs
- Duration: up to 8hrs

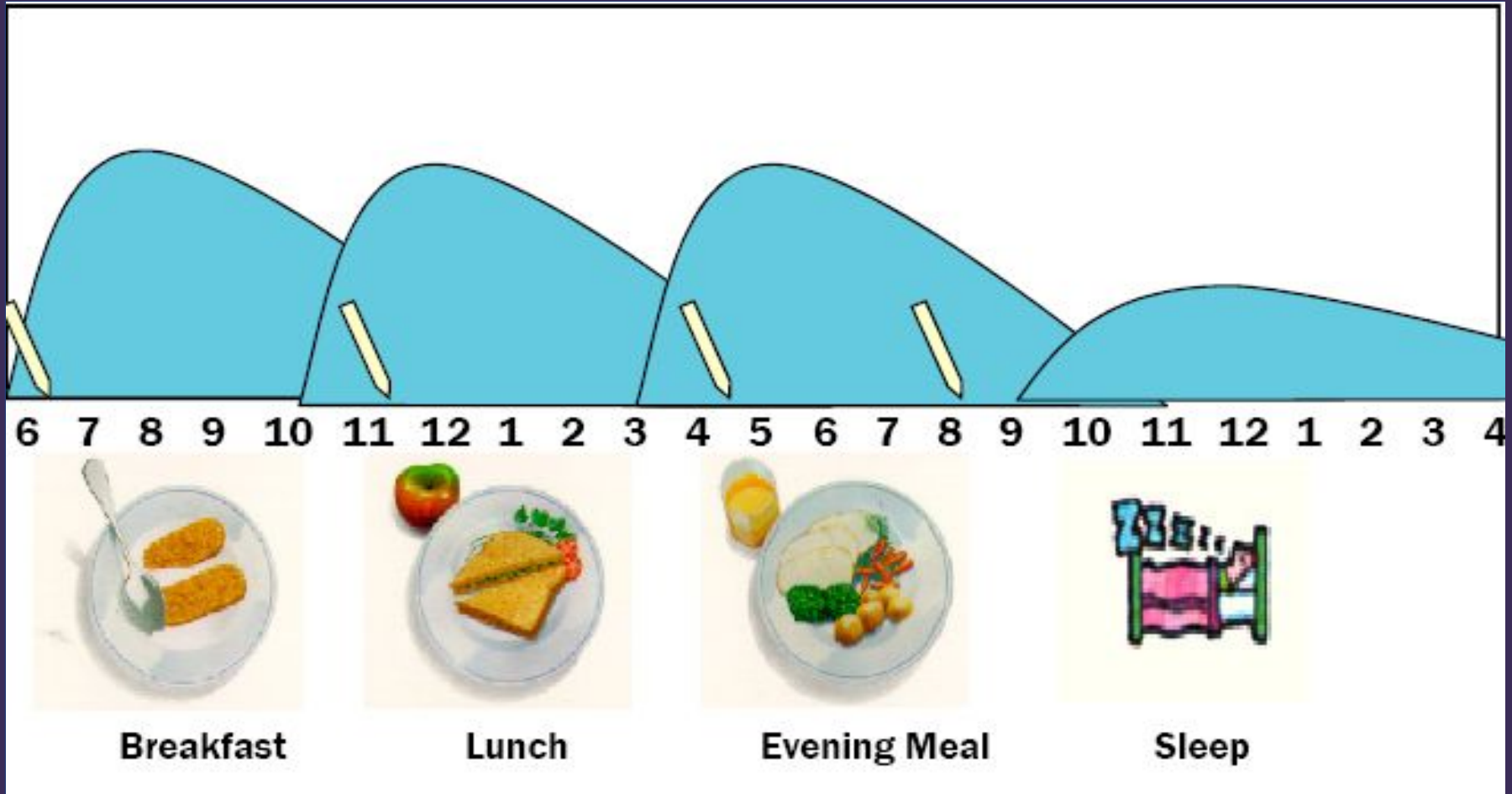


# INTERMEDIATE ACTING INSULIN

- Insulatard; Humulin I
- Cloudy
- Onset 1.5 hrs
- Peak 4-12 hrs
- Duration up to 12 hrs



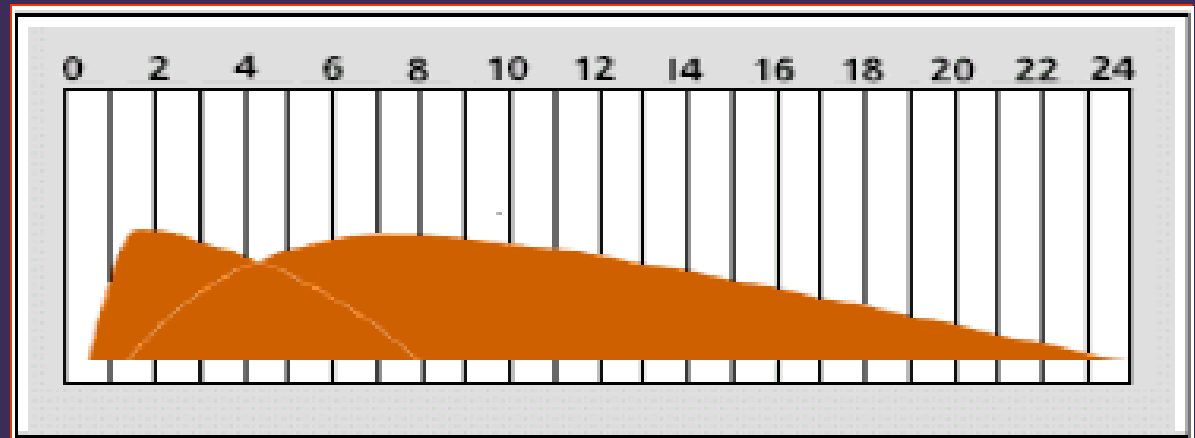
# BASAL BOLUS



# PRE-MIXED INSULIN

## Now limited to:

- Mixtard30; Humulin M3; Humalog Mix 25; Humalog Mix 50 Novomix 30
- Cloudy
- Onset 30 mins
- Peak 2-8 hrs
- Duration up to 24hrs



# LONG ACTING BASAL ANALOGUE INSULINS

## Lantus (Glargine)

- Lasts approx 20-24 hrs



## Levemir (Detemir)

- Lasts approx 15-20 hrs
- Better with weight gain



# SICK DAY RULES

## DO NOT STOP INSULIN!!!

- 4 hrly BG monitoring
- Stop Metformin
- Check blood ketones
- Maintain carbs with fruit juice/sugary drinks
- Add in 10-20% extra short acting insulin if BG >16

## RED FLAGS



- Inability to swallow/keep down fluids
- Persistent diarrhoea
- BG > 20 despite best therapy
- Blood ketones > 3.0
- Those living alone

# COMPLICATIONS

## TYPE 1

Tend to be microvascular:

- Retinopathy
- Diabetic Nephropathy
- Diabetic Neuropathy

## TYPE 2

Tend to be macrovascular:

- CHD
- CVA

# UKPDS

## Improved glycaemic control reduces:

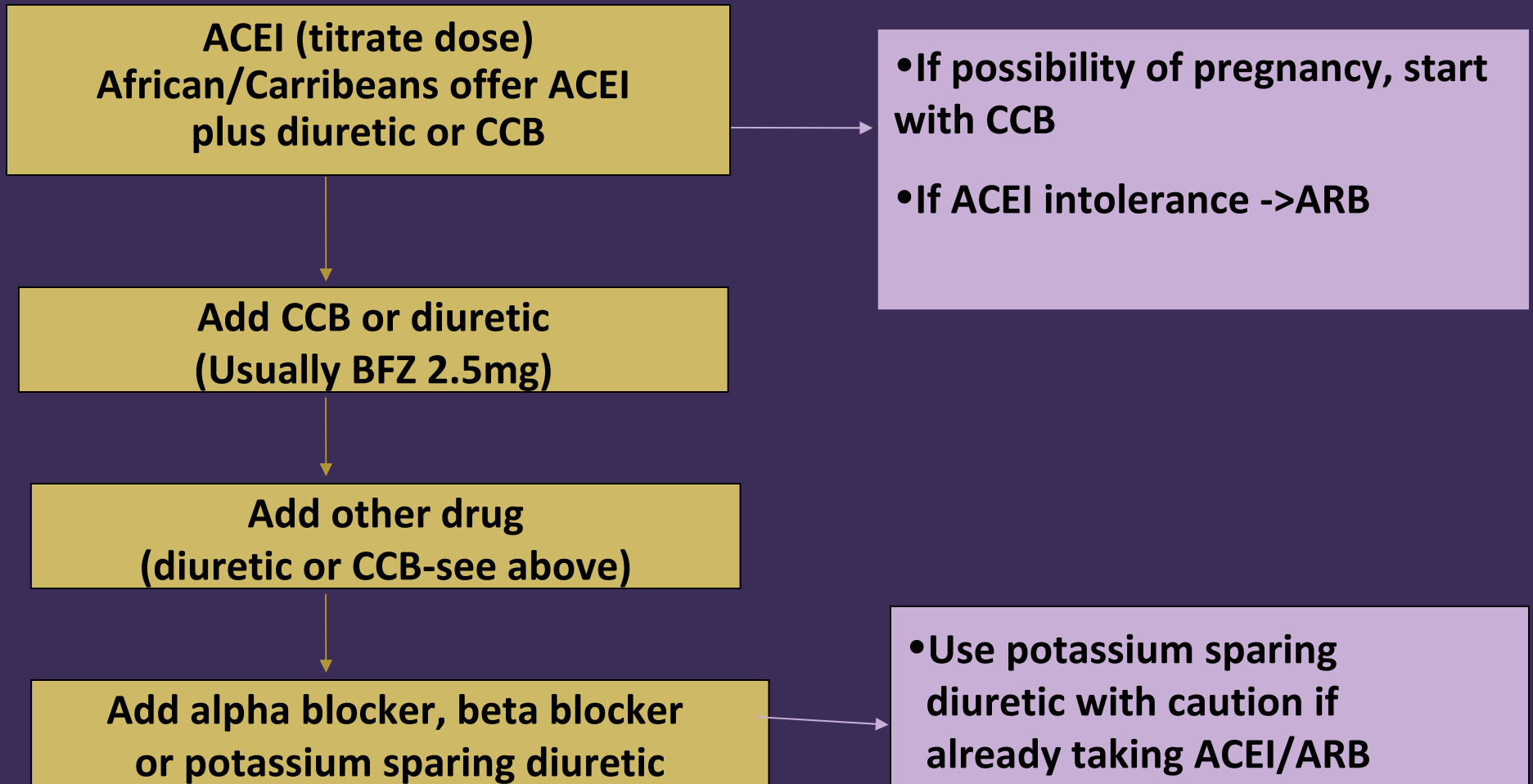
- Diabetic eye disease by 1/3
- Early kidney damage by 1/3

## Improved BP control reduces:

- Death from long term complications by 1/3
- CVA by 1/3
- Eye complications by 1/3

# BLOOD PRESSURE NICE GUIDANCE

- NICE- 140/80  
(with nephropathy 130/70)
- QOF 145/85



# MICROALBUMINURIA

Microalbumin/creatinine  
Ratio (ACR)

(Ranges-men <2.5 women <3.5)

EMU-best of 2 if 1<sup>st</sup> positive

**PROGNOSTIC INDICATOR  
OF CVD IN T2DM &  
DIABETIC NEPHROPATHY  
IN T1DM/T2DM**

Factors that may  
increase ratio

- Short term raised BG
- Exercise
- UTI
- Marked hypertension
- Heart failure
- Acute febrile illness

# MANAGEMENT

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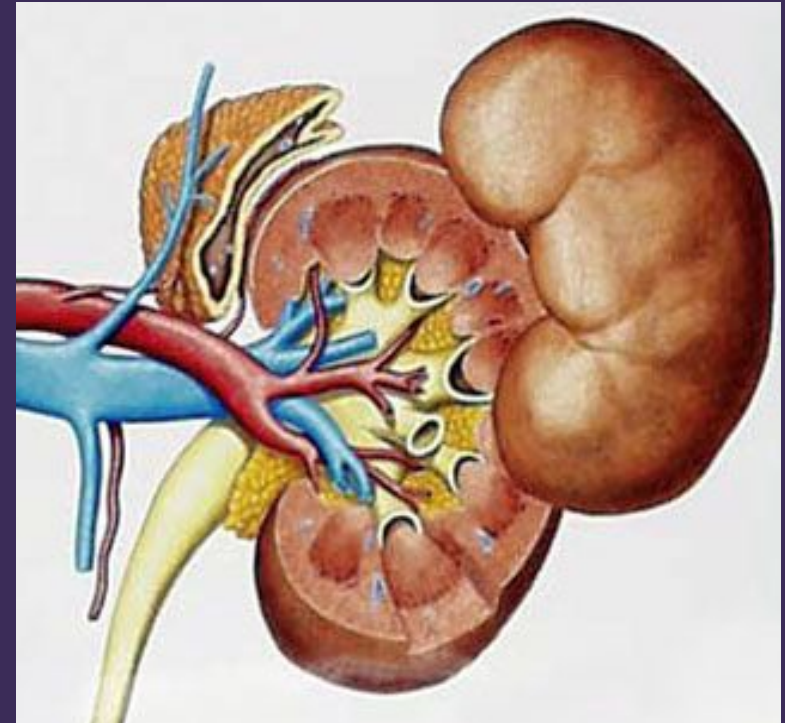
- Check trend of plasma creatinine & eGFR
- Start ACEI/ARB & titrate up to highest tolerated dose
- Re-measure ACR at least 6 monthly
- Aim for tight glycaemic control
- Measure, assess and manage CVD risk factors aggressively

# KIDNEYS

Diabetic nephropathy occurs in up to 30% of people with Diabetes

CVD risk is increased so aim to:

- Treat BP to  $< 130/70$
- Get HbA1c  $< 7\%$
- Get TC  $< 3.5$
- Rx with ACEI/ARB
- Reduce salt/alcohol intake
- Stop smoking-**VITAL**



# LIPIDS

## NICE GUIDANCE

Consider to be at high risk unless ALL of following apply:

- Not overweight
- No microalbuminuria
- Non-smoker
- No high risk lipid profile
- No history CVD
- No FH CVD



# LIPID LOWERING THERAPY

## NICE GUIDANCE

### Use Simvastatin 40mg & aim for:

- TC < 4.0 mmol/l
- HDL  $\leq$  1.4 mmol/l OR
- LDL < 2.0 mmol/l

**If above these then increase to 80mg Simvastatin / add in Ezetimibe or swap to Atorvastatin**

### Fibrates:

Add in if TG=2.3-4.5mmol/l

### Nicotinic Acid:

Only on 2ndry care initiation

### Omega 3 Fish oils

Do not prescribe for primary prevention unless advised by 2ndry care

# ASPIRIN

## NICE GUIDANCE

### Recommended for:

- Age 50+ yrs and BP <145/90
- Age < 50 yrs and significant other CVD risk factors



**“An aspirin a day will help prevent a heart attack if you have it for lunch instead of a cheeseburger.”**

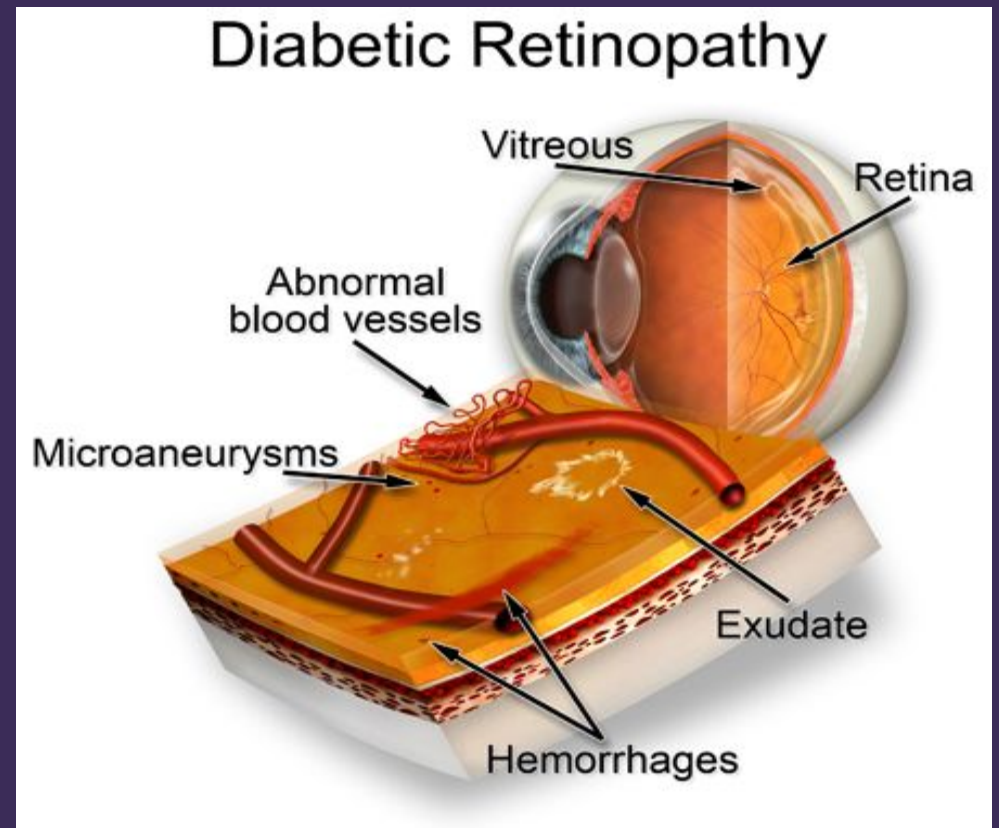
# DIABETIC EYE DISEASE

**Raised blood glucose levels can cause:**

- Diabetic Retinopathy
- Blurred vision

**Also result in increased likelihood of:**

- Cataracts
- Glaucoma
- Occular Nerve Palsies



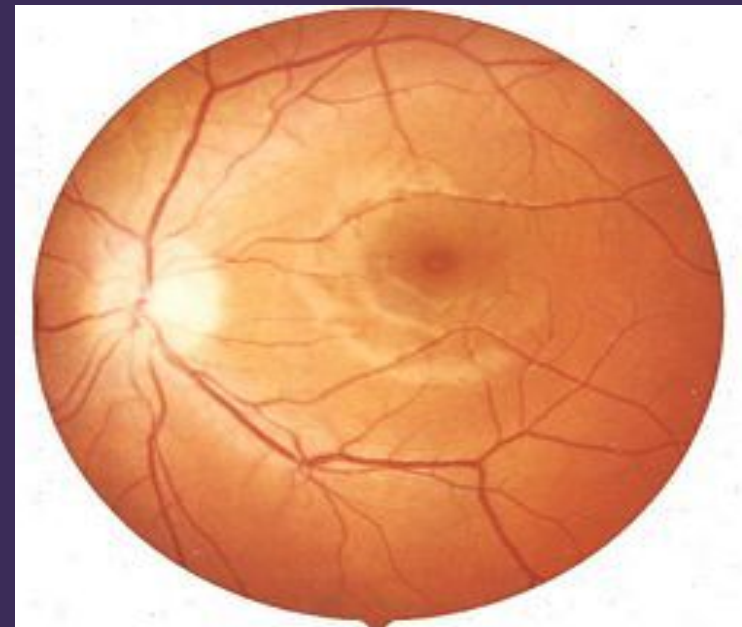
# RETINAL SCREENING

## Oxfordshire Diabetic Eye Screening Service (ODESS)

- All patients must have personal number
- No real provision for housebound

## Laser Treatment suitable for:

- Proliferative Diabetic Retinopathy
- Diabetic Macular Oedema



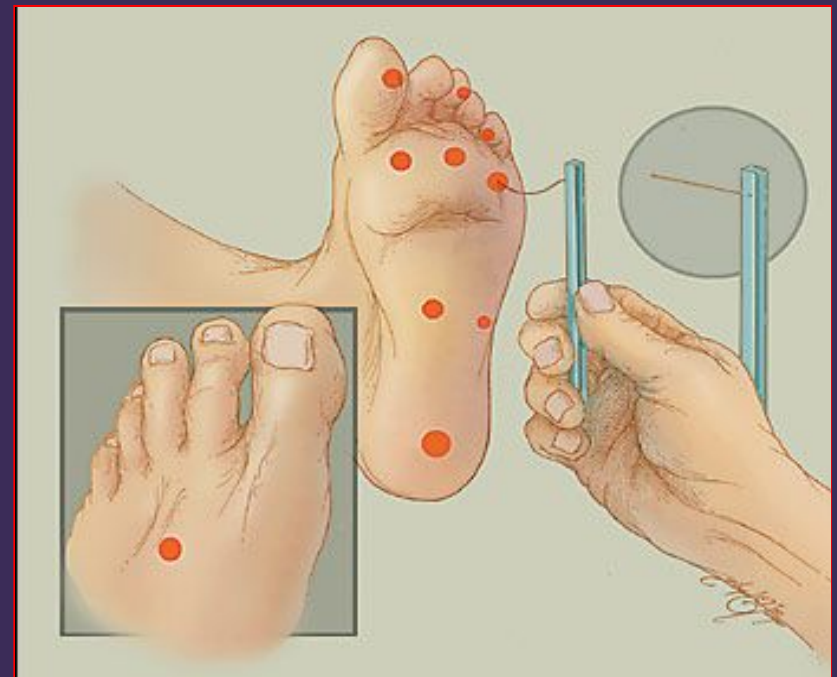
# NEUROPATHY

## Increases with:

- Age and duration of Diabetes
- Poor glycaemic control
- Smoking
- Presence of other diabetes related complications



- **Pain may be helped by:**
- Amitriptyline
- Carbamazepine
- Gabapentin/Pregabalin
- Duloxetine



# ERECTILE DYSFUNCTION

Affects up to 75% of men  
with Diabetes

Often aggravated by:

- Overweight
- Smoking
- Alcohol
- Lack of exercise
- Some medicines

**IF WE DON'T ASK,**  
**PATIENTS WON'T TELL**

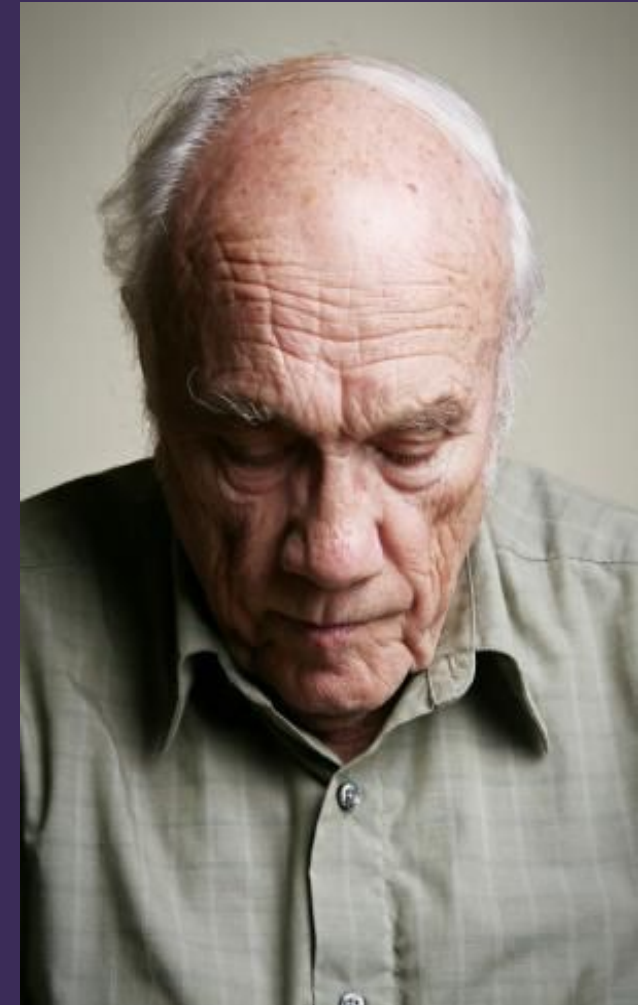


# DEPRESSION

- Increases risk of depression by 50%
- Depression increases risk of Diabetes
- Having both increases risk of Diabetes complications
- Impacts on glycaemic control & quality of life

## Assessment:

- Structured approach
- PHQ -9 if +ve NICE/QOF response



# HOUSEBOUND PATIENTS

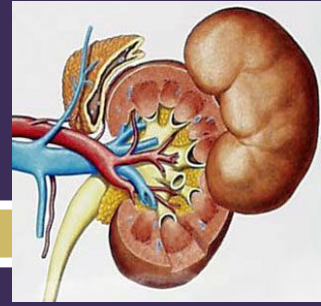


# THANK YOU !!

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# CHRONIC KIDNEY DISEASE (CKD)



- Diabetes causes scarring in filtering section of kidney
- Up to 1:10 adult population
- Over 75yrs = 1:2
- Lose 2/3 of remaining life years
- Most common cause = hypertension

GRADE	GFR ml/min	CONSEQUENCE
CKD 3	30-59	Moderately reduced GFR

# AUTONOMIC NEUROPATHY

Damage to autonomic nerves that supply  
Variety of internal organs:

- Gastroparesis
- Erectile Dysfunction
- Sweating
- Unexplained diarrhoea
- Unexplained bladder emptying problems

# HYPERGLYCAEMIA

## Diabetic Ketoacidosis (DKA)

- Inadequate insulin levels cause cells to use fat reserves
- Ketones are by-products
- High risk of cerebral oedema

## Hyperosmolar Non- Ketotic Acidosis (HONK)

- Mainly in older people with T2DM
- Blood glucose v high
- No acidosis
- High risk of dehydration
- Death rate up to 58%

# WHAT TO CHECK

- Type of insulin
- Fasting and post prandial BG
- ? Hypos
- Injection sites
- Injection technique
- Length of needle



# DELIVERY DEVICES

- **First choose the most suitable insulin for the Patient**
- **Then let them choose their preferred delivery device**
- **Pens come in reusable and disposable**

