



# What is Diabetes?

Lecturer : Gill Dunn, Diabetes Specialist Nurse

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## Pathophysiology

### Overview of session

- Understanding diabetes
- Explore the different types of diabetes
- Diabetes as a long term condition
- Understanding metabolic disease
- Prevention and diagnosis
- Complications of diabetes

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## Prevalence of Diabetes

- >4 million people with diabetes
- Prevalence rising with obesity
- Half a million undiagnosed
- 10% annual NHS budget spent on diabetes
- £8million per year on treatment of complications

1. DUK Facts and Statistics, 2016, [https://www.diabetes.org.uk/Documents/Position%20statements/DiabetesUK\\_Facts\\_Stats\\_Oct16.pdf](https://www.diabetes.org.uk/Documents/Position%20statements/DiabetesUK_Facts_Stats_Oct16.pdf), accessed May 2017

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## Types of Diabetes

Type 1	Type 2
Absence of insulin- auto-immune disease	Insufficient insulin/ insulin resistance
Age of onset- 6/12- 40+ years	Generally >40yrs
GAD positive c-peptide negative <80	GAD negative c-peptide positive >200
Prevalence=10%	Prevalence=85%
Quick onset- acute symptoms	Slow onset- unrecognised symptoms
Treatment- dependant on insulin	Diet/Exercise/oral and injectable therapy
Complications- Retinopathy/CKD	Complications- CVD

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## What is diabetes?

- Diabetes mellitus is a condition in which the amount of glucose (sugar) in the blood is too high because the body cannot use it properly.<sup>1</sup>
- Cardiovascular disease
- Inflammatory response

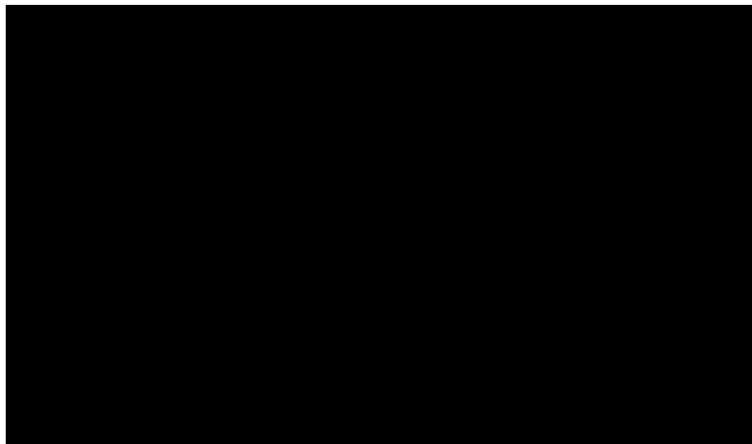
• 1. Diabetes UK, <https://www.diabetes.org.uk/Diabetes-the-basics/>

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## Diabetes



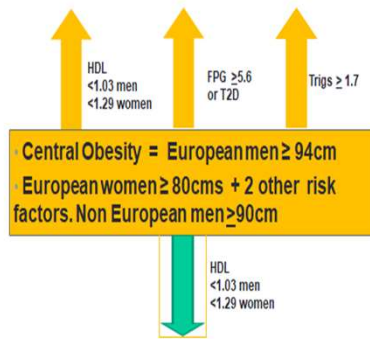
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# Metabolic Disease

## Definition of Metabolic Disease



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## Metabolic syndrome (Syndrome X)

- Central obesity
- High blood pressure
- High triglycerides
- Low HDL-cholesterol
- Insulin resistance



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# Hyperglycaemia



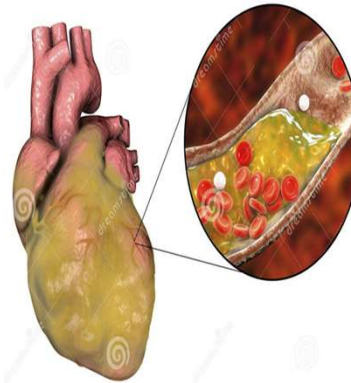
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## Inflammatory Response

- Visceral Obesity
- Pro-Inflammatory cytokines
- Free Fatty Acids-Glycerol
- Insulin Resistance



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## Risk Factors for Type 2 Diabetes

### • Risk Factors

- **Family History**
- Lifestyle/obesity/smoking
- Ethnicity
- **Age**
- High blood pressure/cholesterol
- **Dementia**
- Gestational diabetes

### Other causes

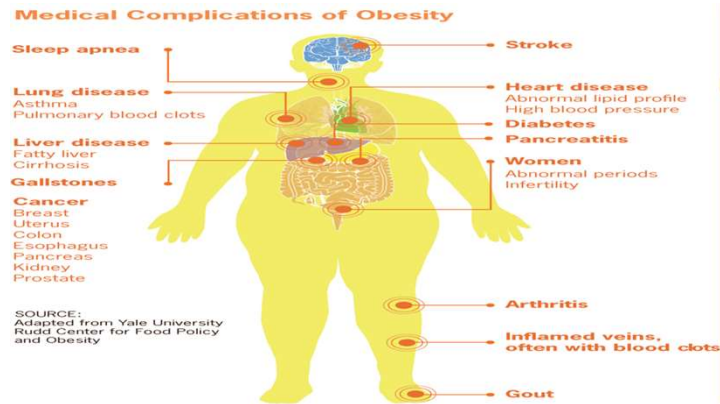
- Drug related
- (steroid / psychotics/diuretics)
- Pancreatic disease/damage
- Endocrine disease
- (cushing's disease)

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## Complications



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## Diagnosis

Normal	Non-diabetic hyperglycaemia (NDH)	Diabetes
Random blood glucose level (2hours post meal)		
< 11mmols		>11mmols
Fasting blood glucose level <7mmols	>5.5mmols	>7mmols
HbA1c <42mmols/mol	42-48 mmols/mol	>48mmols/mol

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## Signs and Symptoms?

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## Signs and Symptoms



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## Glycaemia Control

- HbA1c
- Individualised targets
- Blood Glucose Monitoring
- Relationship with Diet/activity
- Medication

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## CVD Prevention

- Diabetes Kidney Disease:
  - Bloods: u&e's- serum creatinine & -eGFR
  - Urine: albumin creatinine ratio (ACR)
- Hypertension:
  - BP
- Lipid Profile: Statins

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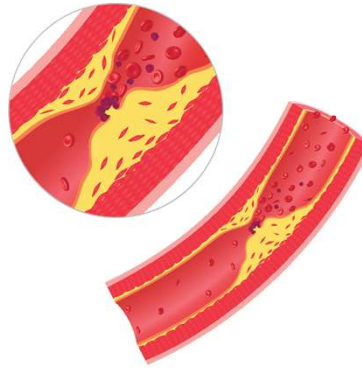


## Atherosclerosis

Diabetes is linked to an accelerated rate of atherosclerosis

Modifiable risk factors

Non modifiable risk factors

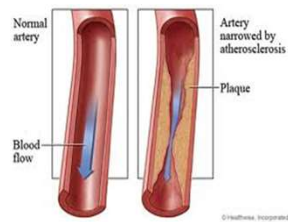


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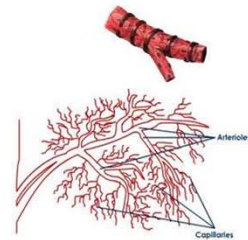
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## Hypertension



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## Diabetic Kidney Disease

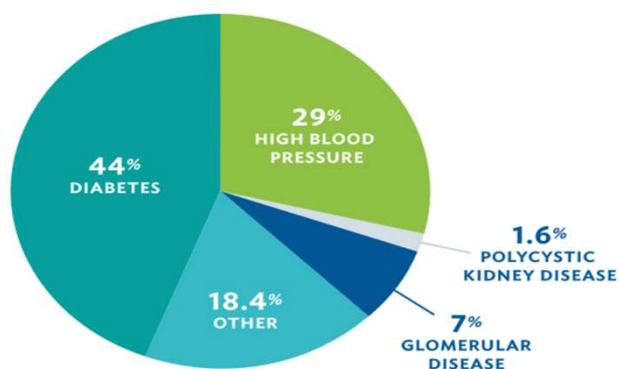
- Indicator of CVD Risk
- Importance of screening and identification
- Addressing lifestyle
- Optimising glycaemia and CVD risk factors
- Role of therapies and de-prescribing
- Safety- AKI/ Hypoglycaemia

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## Causes of Chronic Kidney Disease

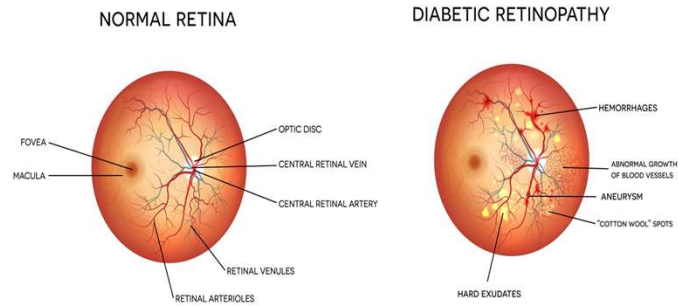


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## DIABETIC RETINOPATHY



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## Diet Advice: True or False?

### Debunking diabetes myths



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## What weight loss strategies are you aware of?

Healthy eating/portion control

Mediterranean

Low carbohydrate/high fat diet

Very low calorie diet (VLCD)- e.g Fast 800

5:2 diet

Intermittent fasting- time restricted eating (TRE)



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## The T-Plate Model



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## Benefits of Exercise

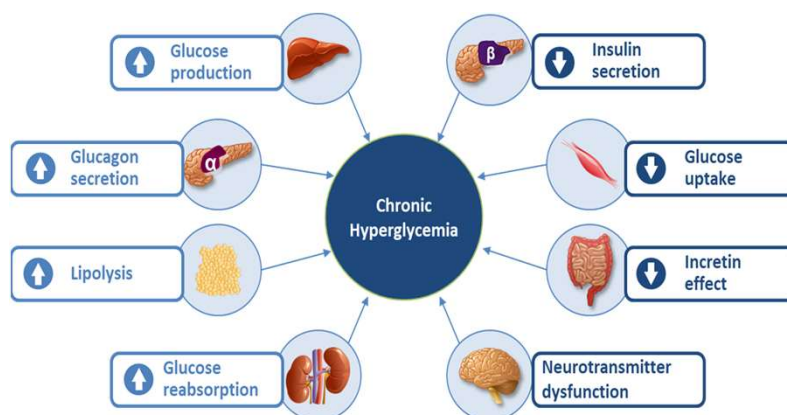
- 20% reduction in total mortality
- 30% reduction in diabetes related deaths
- 50% reduction in fasting glucose
- 40% reduction in obesity related cancer deaths
- 15% reduction in LDL
- 18% increase in ADL
- 30% reduction in triglycerides
- 10 mm Hg in systolic blood pressure
- 20 mm Hg reduction in diastolic blood pressure

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## The Ominous Octet



1. DeFronzo RA. Diabetes. 2009;58:773-795

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## Dave

- Age 54yrs
- T2D for 4 years
- Father had MI age 58yrs
- HbA1c 82mmols
- Weight 132kgs BMI 40
- BP 134/82
- Good kidney function
- Medication-only metformin-max dose
- Gliclazide 80mgs BD
- Travels a lot for work

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## The Annual Review

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