

# Cardiovascular Disease: Hypertension to Heart Failure

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—BELMATT—  
HEALTHCARE TRAINING

## Objectives:

- Overview of cardiovascular disease (CVD)
- Overview of hypertension (HTN)
- Explore national guidelines
- Importance of lifestyle interventions
- Overview of heart failure and atrial fibrillation

# Cardiovascular Disease (CVD)

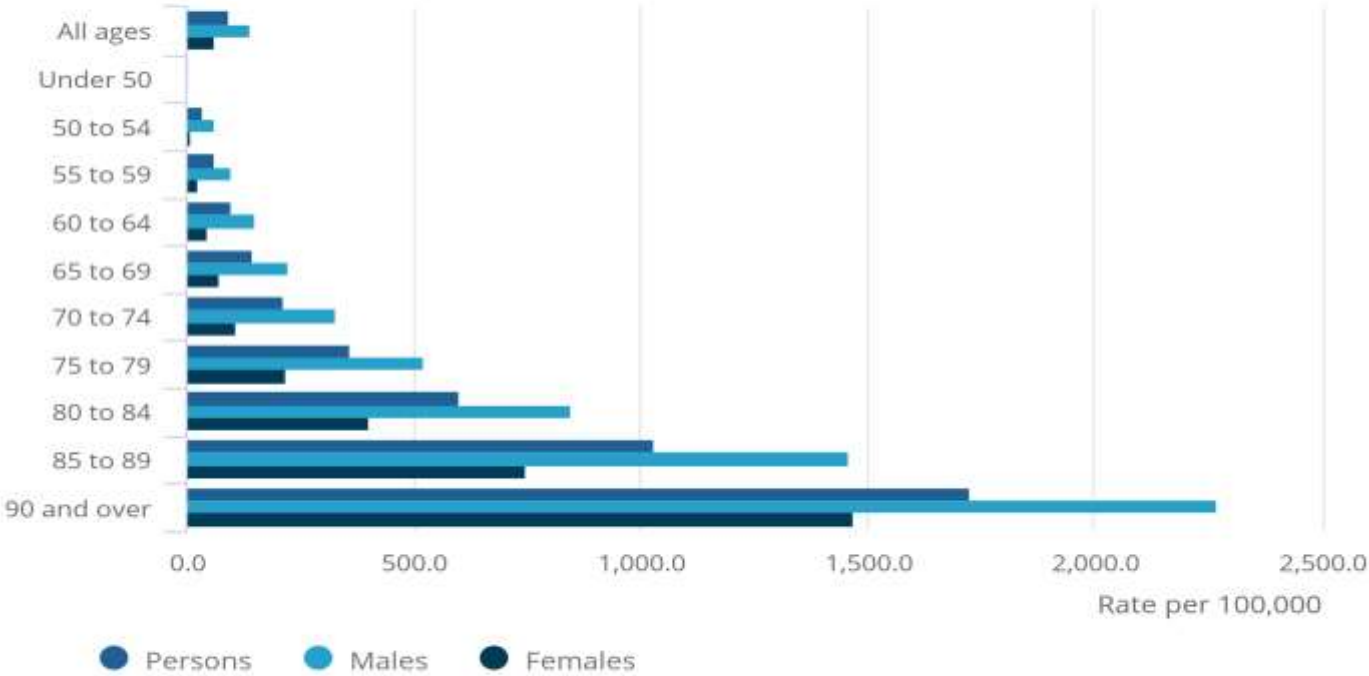
- Coronary Artery Disease (MI/heart failure)
- Cerebrovascular Disease (Strokes TIA's)
- Peripheral Artery Disease (intermittent claudication of lower limbs)
- Aortic Atherosclerosis (thoracic and abdominal aneurysms)
- Others: endocarditis, rheumatic heart disease, conduction abnormalities

# Cardiovascular Disease Epidemiology:

- CVD number 1 cause of death globally
- Second cause of death in UK
- Most common contributing cause is diabetes
- 1,500 premature deaths each year
- £140million NHS spend each year
- Over 5million in UK living with undiagnosed hypertension
- 5million with diabetes
- 850,000 undiagnosed diabetes

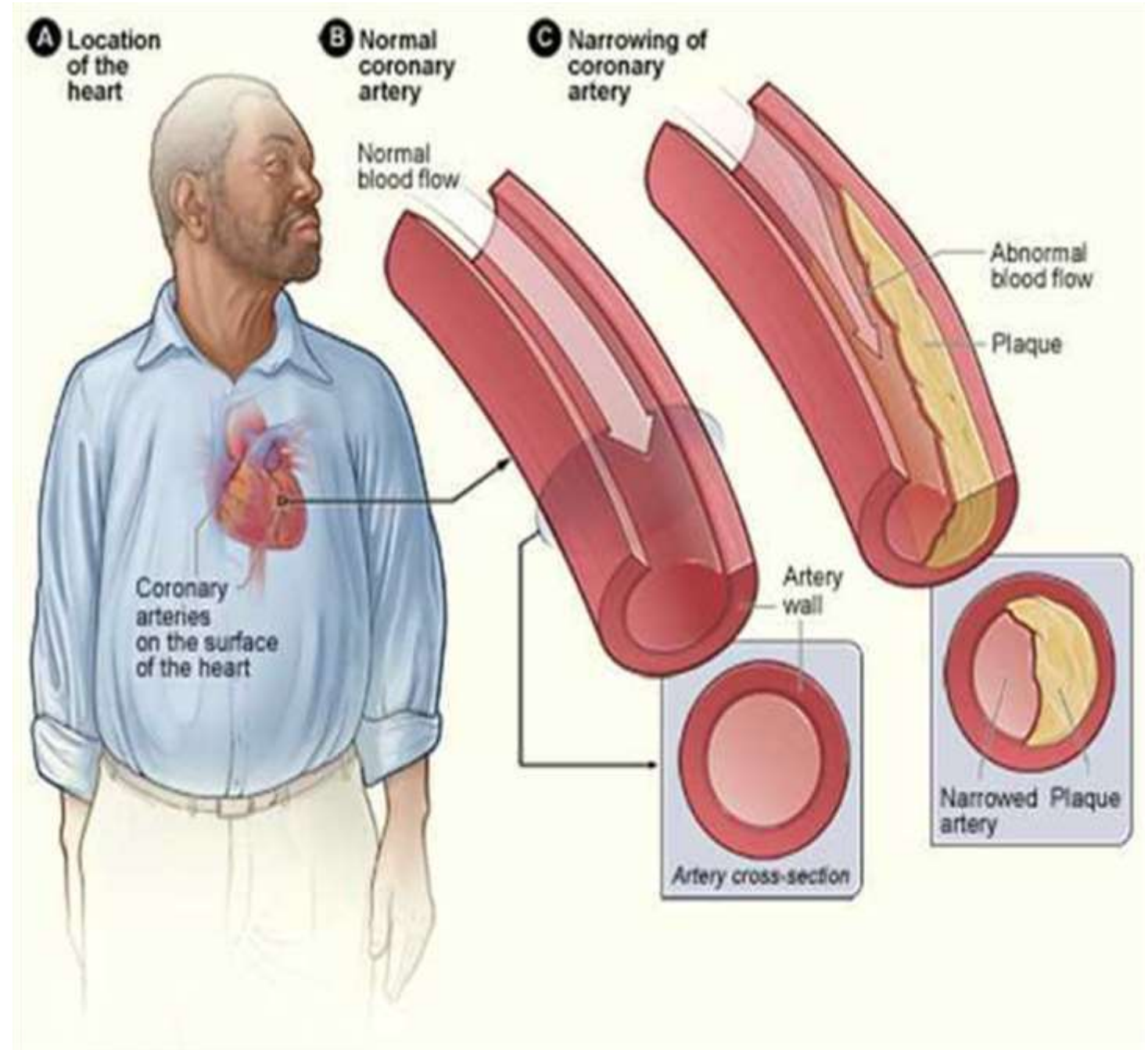
# Age-specific Mortality Rates in UK 2019:

Figure 2: Age-standardised and age-specific mortality rates due to ischaemic heart diseases, England and Wales, deaths registered in 2019



# Atherosclerosis

- Dyslipidemia-plaque buildup in the wall of the arteries
- Inflammatory pathways
- Endothelial damage
- Calcification





# Risk Factors for CVD

Age

Race

Family history

Chronic conditions (CKD, diabetes and lung disease)

Overweight or obesity

Lack of exercise

Smoking

Salt intake

Vitamin D deficiency

Alcohol abuse

Stress

# Risk Factors for CVD

- INTERHEART study<sup>1</sup> 52 countries
- 9 modifiable risk factors accounted for 90% of the risk having the first MI

*Smoking, Dyslipidaemia, hypertension, diabetes, obesity, psychosocial factors, consumption of fruit and vegetables, alcohol, physical activity*

- Framingham Heart Study<sup>2</sup>  
60-90% of CVD events had at least one risk factor

1.Yusuf S, Hawken S, Ounpuu S, Dans T, Avezum A, Lanas F, McQueen M, Budaj A, Pais P, Varigos J, Lisheng L, INTERHEART Study Investigators. Effect of potentially modifiable risk factors associated with myocardial infarction in 52 countries (the INTERHEART study): case-control study. Lancet. 2004 Sep 11-17;364(9438):937-52.

2.Fox CS, Pencina MJ, Wilson PW, Paynter NP, Vasan RS, D'Agostino RB. Lifetime risk of cardiovascular disease among individuals with and without diabetes stratified by obesity status in the Framingham heart study. Diabetes Care. 2008 Aug;31(8):1582-4.



# Type 2 Diabetes

Type 2 Diabetes is a cardiovascular disease

- Metabolic Syndrome  
Hypertension, dyslipidaemia and insulin resistance
- Obesity-visceral fat/free fatty acids/glycerol
- Inflammatory response-cytokines
- Atherosclerosis

# Primary Prevention

NHS Long Term Plan-  
CVD biggest cause of  
preventable death  
and ill-health

CVDPREVENT-  
national audit

Public Health  
England:  
Cardiovascular  
Prevention Packs

Quality Outcome  
Frameworks

National Diabetes  
Audit

Local incentives-  
enhanced service  
payments

# Call to Action

## Call to action

### Local authorities



offer population  
**lifestyle programmes**



raise public awareness  
of **blood pressure** and  
its opportunistic  
detection

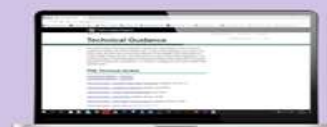


promote and improve  
uptake of **NHS Health  
Check**

### Clinical Commissioning Groups



increase uptake and  
identify those who  
could benefit from an  
**NHS Health Check**



Use data to inform  
local action on CVD  
prevention



ensure practices are  
following the **NHS  
RightCare CVD  
Prevention Pathway**

### General practice



prioritise local detection, treatment and  
management of AF, high blood pressure  
and high cholesterol as part of the  
**RightCare CVD Prevention Programme**

### Pharmacists



offer  
**opportunistic  
testing**



support  
**healthy  
lifestyles**



help deliver  
**NHS Health  
Checks**

### Community settings

opportunistic case-finding for high blood  
pressure and pulse checks can take place in:



The workplace  
community centres  
gyms  
supermarkets

# National Guidelines:

- NICE: Hypertension in Adults NG136  
2019 (covers diabetes)
- NICE: Hypertension in Pregnancy NG133
- NICE: Lipid modification CG181 2016
- NICE: Chronic Heart Failure in Adults  
NG106 2018
- NICE: Atrial Fibrillation: management  
CG180 2021

# What Can We Do?: Find

- Opportunistic surveillance- BP/pulse checks
- Routine screening- NHS checks/ mental health checks
- Clinical history-signs and symptoms
- QRisk Score2- toolkit
- Family history
- Identifying risk factors
- Investigations

What Can We  
Do?:

Treat  
Manage

- Promote awareness- ask if patients know their numbers
- Support behaviour change – sign posting
- Education and advice
- Surveillance and monitoring
- Optimise therapies
- Audit/registers/coding
- HCP training to support identification and managing CVD

# Lifestyle

- Smoking cessation
- Weight management
- Physical activity  
'Get Moving Campaign'
- Salt reduction
- Alcohol
- Wellbeing



# The 'S' Sins

Smoking

Sitting/sedentary/sarcopenia

Sick Fat (visceral)

Sugar/ Snacking

Salad dodging/ Sandwich culture

Stress

Social deprivation/Solitude/Sadness

Sleep deprivation

# Hypertension

- Cardiac output
- Systemic vascular resistance
- Renin-angiotensin-aldosterone system
- Autonomic nervous system

# Hypertension

## Primary (essential) hypertension

- No identifiable cause
- Can develop gradually over many years
- May be hereditary

## Secondary hypertension

- Caused by underlying condition
- Tends to appear suddenly
- Causes higher blood pressure than primary hypertension
- Various medications

# Risks of Hypertension

Aneurysms

Metabolic syndrome

Stroke

Cognitive difficulties/ dementia

Heart attack

Heart failure

Vascular eye problems

Chronic kidney disease

# Symptoms

Used to be known as the “silent killer”

Often no signs or symptoms of the underlying hypertension, even at high level readings.

May sometimes present as headaches, SOB and nosebleeds.

Symptoms are not specific and can vary from person to person

# Diagnosis



- **Stage 1:**
- BP 140/90 to 159/99 or HBPM average 135/85 to 149/94
- **Stage 2:**
- BP 160/100 to 180/120 or HBPM average >150/95
- **Stage 3:**
- BP systolic >180 or diastolic >120
- Accelerated hypertension: severe increase >180/120 and retinal haemorrhage

# Drug Therapy

- ACE -ramipril
- ARB - losartan
- Thiazide-like diuretic
- Beta blocker - bisoprolol
- Aldosterone antagonist - spironolactone

## African or Caribbean

- CCB eg amlodipine
- Thiazide-like diuretic - indapamide,



# Dyslipidaemia

Abnormal amounts of lipids in the blood

- **LDL cholesterol** causes plaques to form in the blood vessels
- **HDL cholesterol** can help to remove LDL from the blood.
- **Triglycerides** stored in fat cells.

# Lipid Management

- Full lipid profile= total cholesterol, non-HDL cholesterol  
HDL-C high density lipoprotein and triglyceride
- Establish risk using QRisk3 score- treat if >10%
- Atorvastatin 20mg for primary prevention  
80mg for secondary prevention
- Aim for > 40% reduction in non-HDL cholesterol

# Atrial Fibrillation(AF)



- Disorder of electrical impulses
- Abnormal heart rhythm or arrhythmia
- Heart's two chambers beat irregularly
- Do not coordinate with ventricles
- Caused by high BP , valve disease, pericarditis, cardiomyopathy

# Atrial Fibrillation(AF)



- Up to 90% of AF events may be asymptomatic
- Accounts for 1:6 strokes
- Complications of AF include heart failure and thromboembolism
- If 100 people with AF are treated an average of 4 strokes are prevented

# Atrial Fibrillation

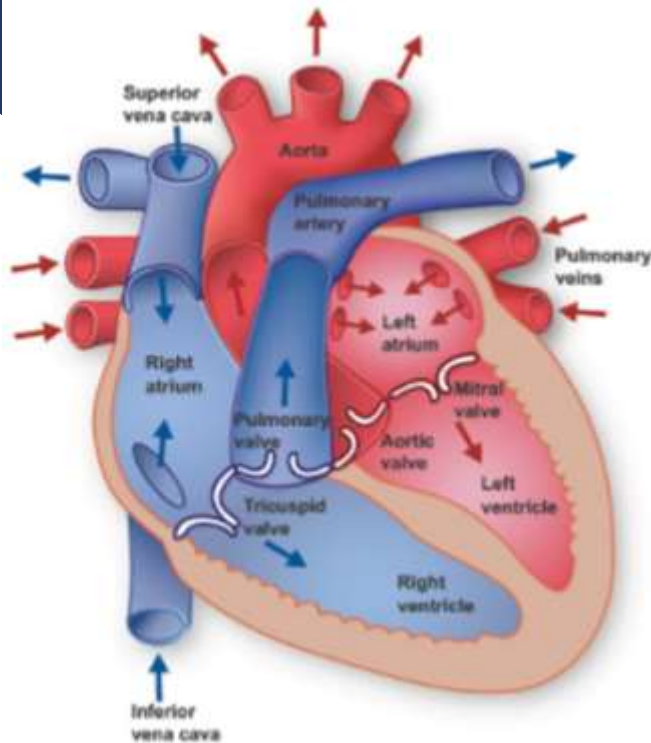


- CHECKING PULSES- It only takes a minute
- CHADS2 CHADS2VASc toolkits
- Diagnosis confirmed with ECG
- Treatment- anticoagulation

# What is Heart Failure?

- Structural or functional abnormalities which impairs the pumping action of the left ventricle

# Heart Failure



## Impairment of left ventricular filling<sup>2,3</sup>

- In diastole, the left ventricle (LV) walls relax allowing for filling of the LV cavity
- Without proper LV relaxation, the volume of blood filling the cavity is reduced, thus reducing the stroke volume, the volume of blood ejected with each contraction

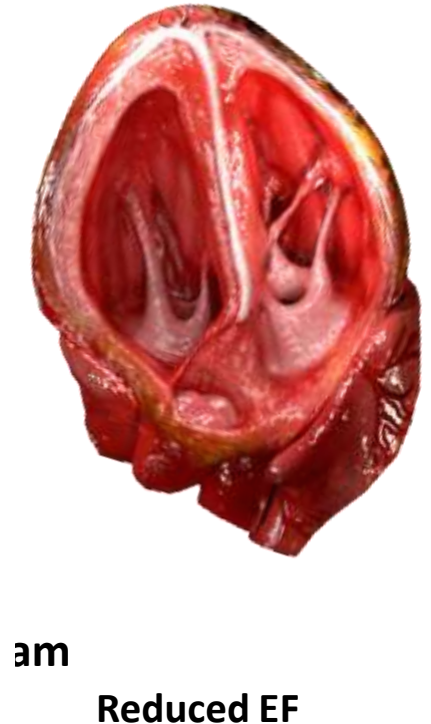
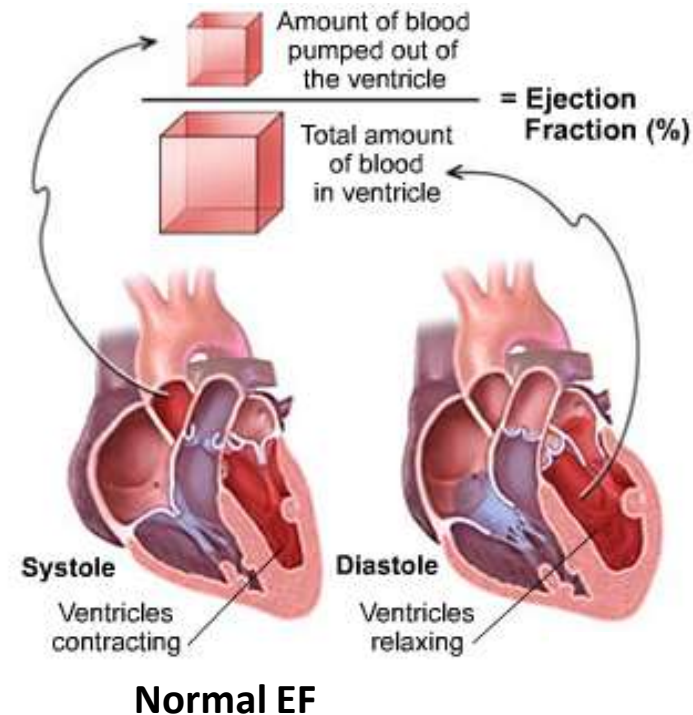
## Impaired ejection of blood

- Due to LV wall damage, the LV may have reduced ability to pump or eject the blood

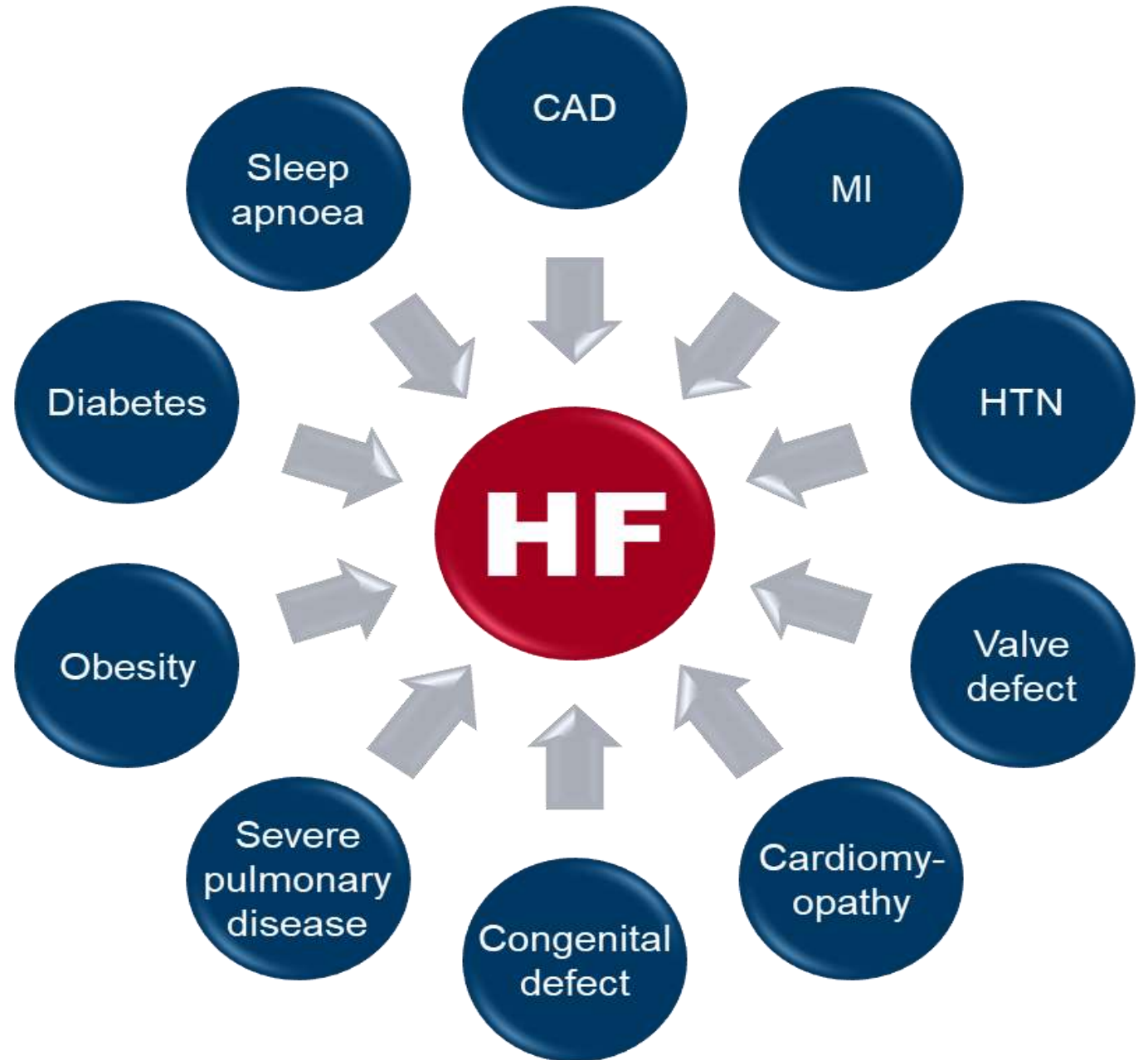


# Ejection fraction (EF) is a key criteria in heart failure management

- **EF** is the percentage of blood that is pumped out of the heart during each beat
- A normal EF is  $\geq 50\%$
- Heart failure with an EF  $\leq 40\%$  is known as **heart failure with reduced ejection fraction (HFrEF)**
- Heart failure in the setting of a normal EF is known as **heart failure with preserved ejection fraction (HFpEF)**



# Causes of Heart Failure?



# Symptoms of Heart Failure

Oedema

Dyspnoea

Fatigue

Coughing or  
wheezing

Sudden weight  
gain

Orthopnea

Frequent  
urination at  
night

Light  
headedness or  
dizziness

Confusion

# Detailed clinical assessment

## Fluid overload

- NTproBNP
- FBC
- ELECTROLYTES
- ECG
- ECHOCARDIOGRAM
- CHEST XRAY
- Cardiac MRI



## INVESTIGATIONS

## Main Drugs in Heart Failure

- ACE inhibitors –*ramipril, lisinopril*
- ARB - entresto
- Beta blockers –*bisoprolol*
- *SGLT2- dapagliflozin*
- Diuretics –*Frusemide*
- Aldosterone antagonist –*spironolactone*
- Digoxin

- Adjusting medications to suit the patient and treat heart failure effectively to manage symptoms
- Teaching the patient to self-manage the condition by:
  - *Eating a healthy heart diet – (low salt and fat)*
  - *Managing fluid balance including monitoring weight*
  - *Stop smoking*
  - *Limiting alcohol intake*
  - *Take regular activity*

## How Do We Manage Heart Failure?



## Key Learning Points

- CVD is largely preventable
- Early identification and management saves lives
- Opportunistic screening
- Ask Assess Action
- Referral to specialist care



# Resources

- Diabetes UK: Information prescriptions-Hypertension/Cholesterol  
[www.diabetes.org](http://www.diabetes.org)
- Blood Pressure UK  
[www.bloodpressureuk.org](http://www.bloodpressureuk.org)
- British heart Foundation: [www.bhf.org](http://www.bhf.org)