



The Actuarial Profession

making financial sense of the future

Critical Illness Definitions Working Party
Speakers: Matthew Smith, James Tait & Aaron Tindale



Playing the definitions game:
What value in doing more?

May 2011

Members of CI Definitions Working Party



Adele Groyer



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James Tait



Aaron Tindale



Peter Banthorpe
PEC Representative

Overview

Section 1: Matthew Smith

- Working party objectives and proposed research
- Results of initial claims survey
- Patient paths to treatment for coronary artery disease

Section 2: James Tait

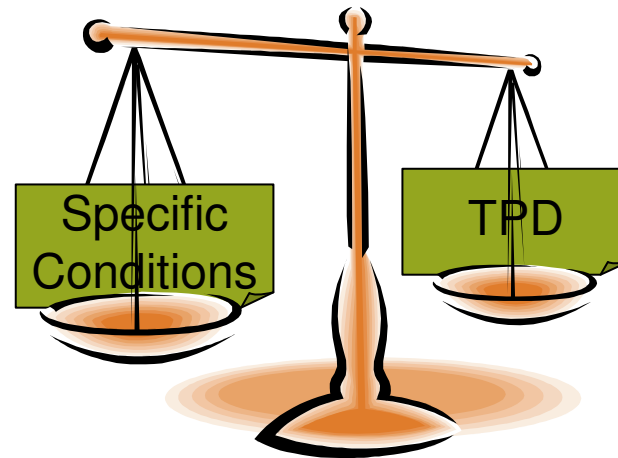
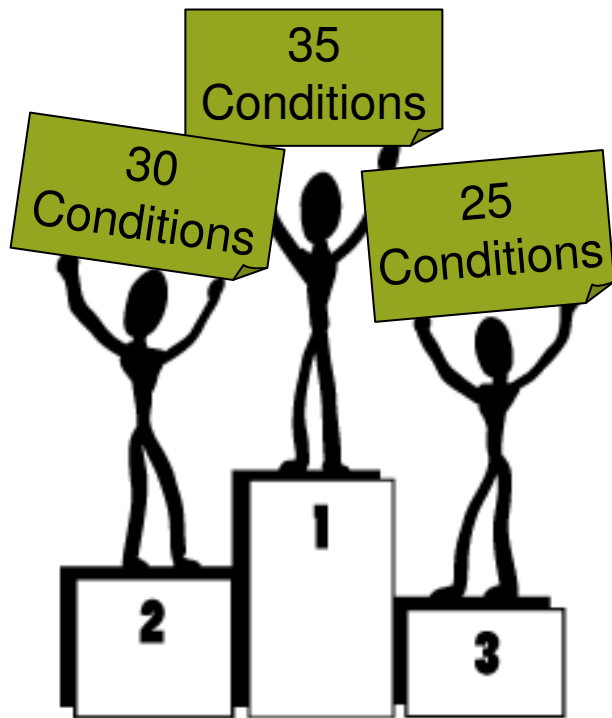
- Risk factors for CAD
- CAD treatments: Coronary Artery Bypass Graft & Angioplasty

Section 3: Aaron Tindale

- Heart Valve Replacement or Repair
- Next steps

ABI+ and non-ABI Conditions

- Why?



ABI+ definitions

Critical war switches to ABI+ battle

The race among insurers to offer the biggest number of critical-illness conditions has been replaced by increasing competition to offer the most ABI+ definitions

- Money Marketing, 20 August 2010

What do we mean by “ABI+ definitions”

- Less strict definition than required by ABI guidelines, usually by removal of one of the criteria for a valid claim

Condition	ABI+ version
Aorta graft surgery	Traumatic injury exclusion removed
Coma	96 hours of life support requirement removed
Heart attack	Typical clinical symptoms requirement removed
Heart valve replacement or repair	Median sternotomy requirement removed
CABG	Median sternotomy requirement removed
Third degree burns	20% of body OR 50% of face
Loss of hands or feet	Loss of hand or foot

Working party objectives

- Estimate current population incidence of ABI+ & non-ABI conditions
- Suggest scenarios of how incidence may change in future
 - Trends
 - Shocks
- Highlight any special risks with offering cover on this basis

What's in scope?

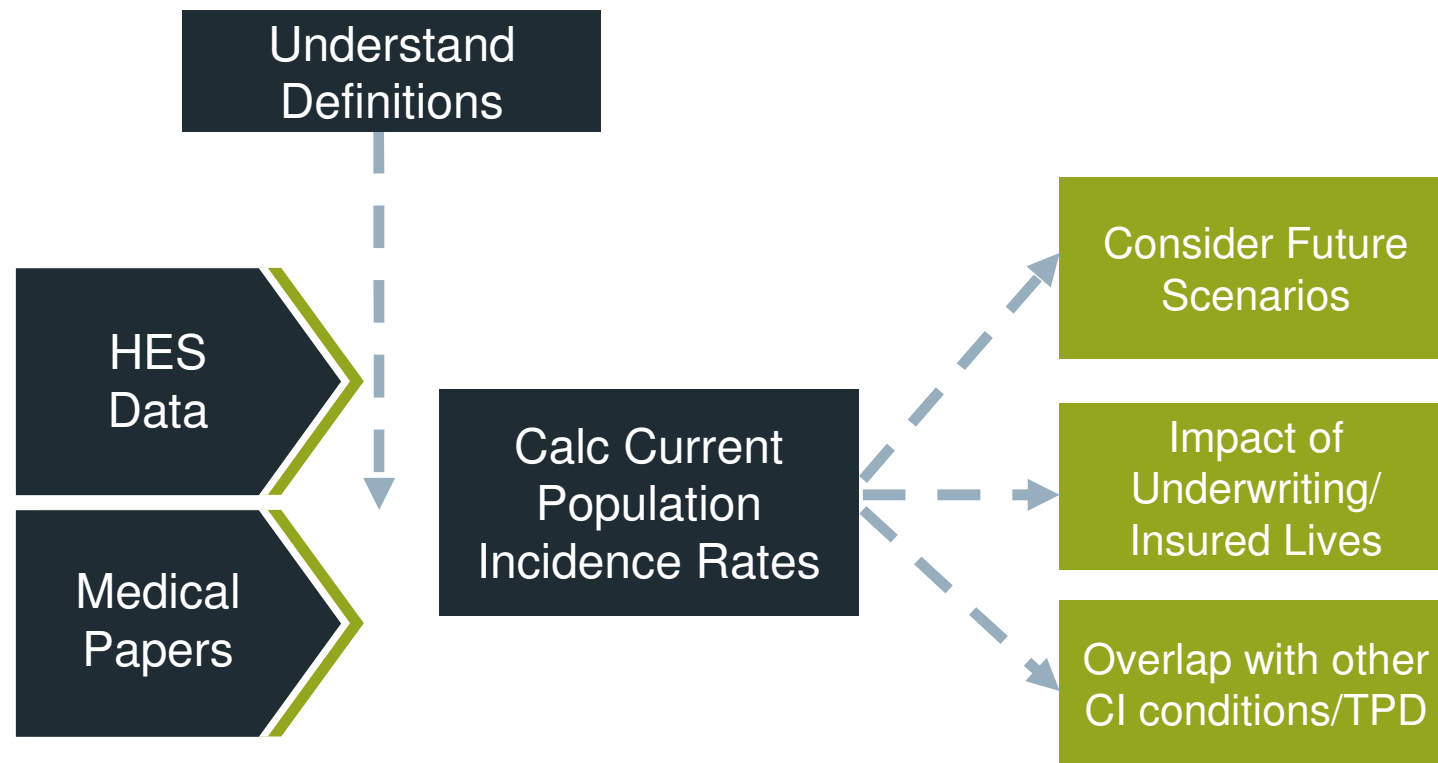
- ABI+ & non-ABI conditions
- Start with heart-related conditions

Ready for presentation	In progress
CABG (ABI+)	Aorta graft surgery (ABI+)
Angioplasty (non-ABI)	Cardiomyopathy (non-ABI)
Heart valve replacement or repair (ABI+)	Heart attack (ABI+)
	Primary pulmonary hypertension (non-ABI)
	Open heart surgery (non-ABI)

What's in scope?

Other ABI+	Non-ABI Nervous System	Non-ABI other
Benign Brain Tumour	Bacterial meningitis	Aplastic anaemia
Coma	Creutzfeld-Jakob Disease	Emphysema / Respiratory failure
Loss of hand or foot	Dementia	Diabetes
Third degree burns	Encephalitis	Liver failure
	Progressive Supranuclear Palsy	Mastectomy
		Rheumatoid arthritis
		Systemic lupus erythematosus
		Low grade prostate cancer

Methodology



Hospital Episode Statistics

- Definition

Definition	Record level data warehouse managed by the NHS Details of all admissions to NHS hospitals Inpatients and day cases are included Collected annually by financial year
Use	Admitted patients is often used as a proxy for disease/procedure incidence (with adjustment) Many fields available; age, geography, diagnosis etc “Exploring the Critical Path” used HES data for MI, stroke, CABG & MOT

Hospital Episode Statistics - Data Quality

Issues Possible lack of rigorous validation at source
Variations in data collection over time, ICD/OPCS changes
Available fields changes from year to year

Episodes Continuous period of care with a particular consultant
i.e. movements between consultants/providers or separate
spells will result in multiple records

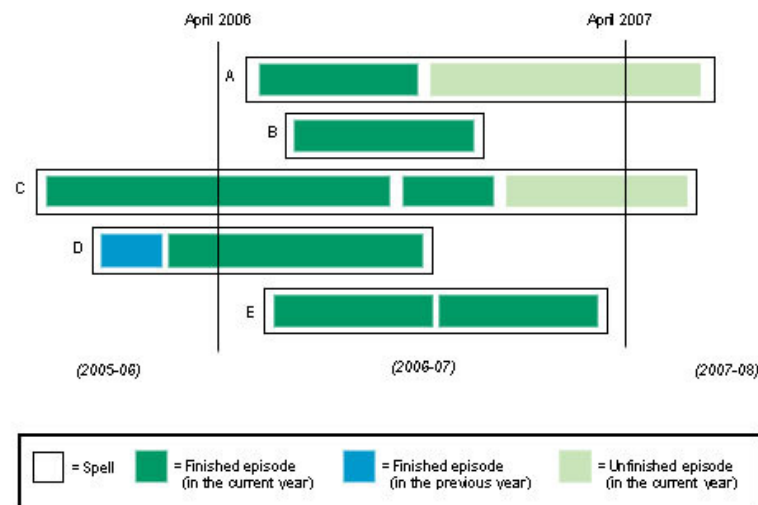


Figure 2. Illustration of spells, episodes, admissions, discharges and in-year data.

Source: HESonline

Hospital Episode Statistics

- New Approach

We have requested serial data

Individual patient admissions with unique IDs

Will allow complete history of each life

Patient ID	Admission Date	Diagnosis	Description	Operation	Description
12345ABC	01/07/1995	S82.0	<i>Fracture of patella</i>	-	-
12345ABC	23/04/2000	I20.0	<i>Unstable angina</i>	-	-
12345ABC	26/07/2002	I66.0	<i>Occlusion and stenosis of middle cerebral artery</i>	-	-
12345ABC	01/01/2004	I63.3	<i>Cerebral infarction due to thrombosis of cerebral arteries</i>	-	-
12345ABC	31/08/2009	I21.0	<i>Acute transmural myocardial infarction of anterior wall</i>	K40.3	<i>Saphenous vein graft replacement of three coronary arteries</i>
67890DEF	01/03/2003	I21.0	<i>Acute transmural myocardial infarction of anterior wall</i>	-	-

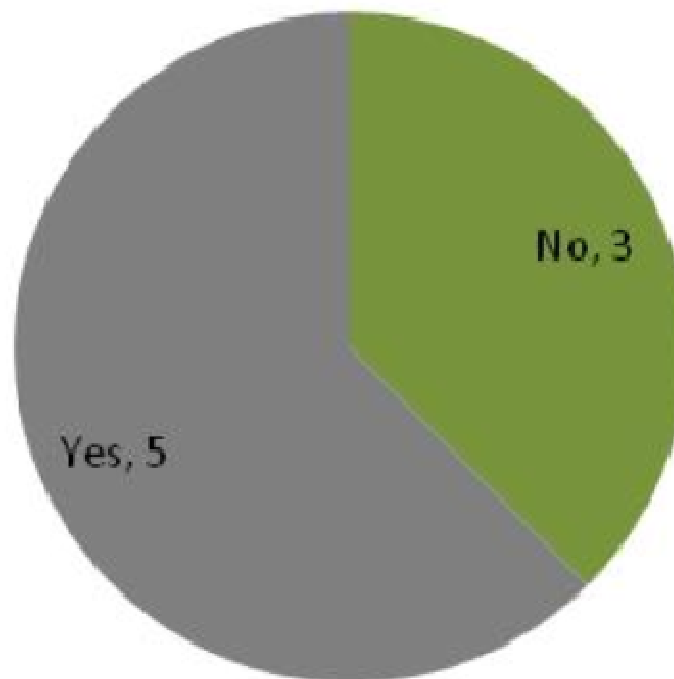
Mini Claims Survey

- Are you aware of any claims on business reinsured by you being paid on ABI+ definitions where the need for **median sternotomy** has been removed?

Yes/No

Mini Claims Survey

Q1 - Claims on ABI+ def

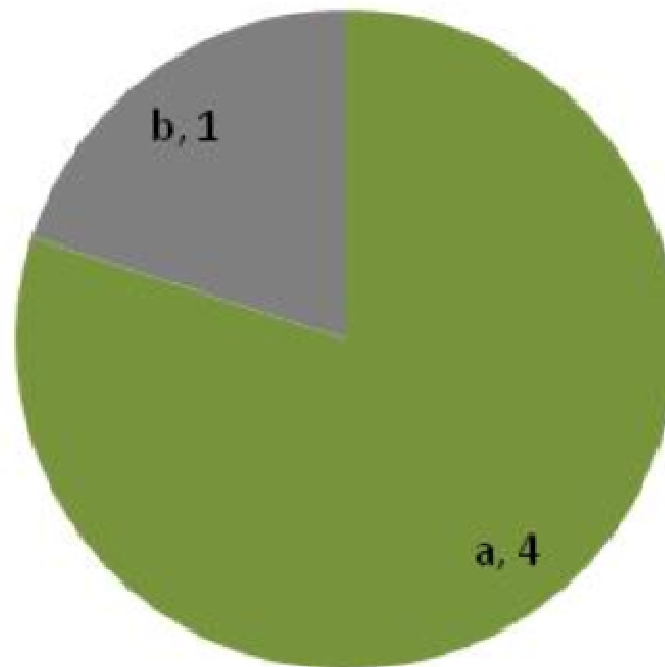


Mini Claims Survey

- If you have had claims on the ABI+ definition, broadly how many such claims have been paid?
 - a. Probably less than 5;
 - b. Probably more than 5 but less than 20;
 - c. More than 20.

Mini Claims Survey

Q2 - a. <5, b5-20, c20+

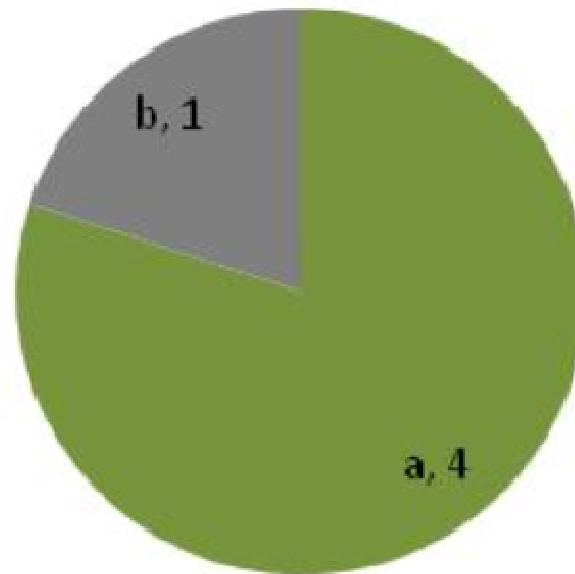


Mini Claims Survey

- If you have had claims on the ABI+ definition, please select one of the following options which most adequately describes your feel for these claims:
 - a. They all would have been paid even if median sternotomy was still required as part of the definition;
 - b. The majority would have been paid even if median sternotomy was still required as part of the definition;
 - c. The majority would have been declined if median sternotomy was required as part of the definition;

Mini Claims Survey

Q3 - a. all paid anyway, b majority paid, c majority declined



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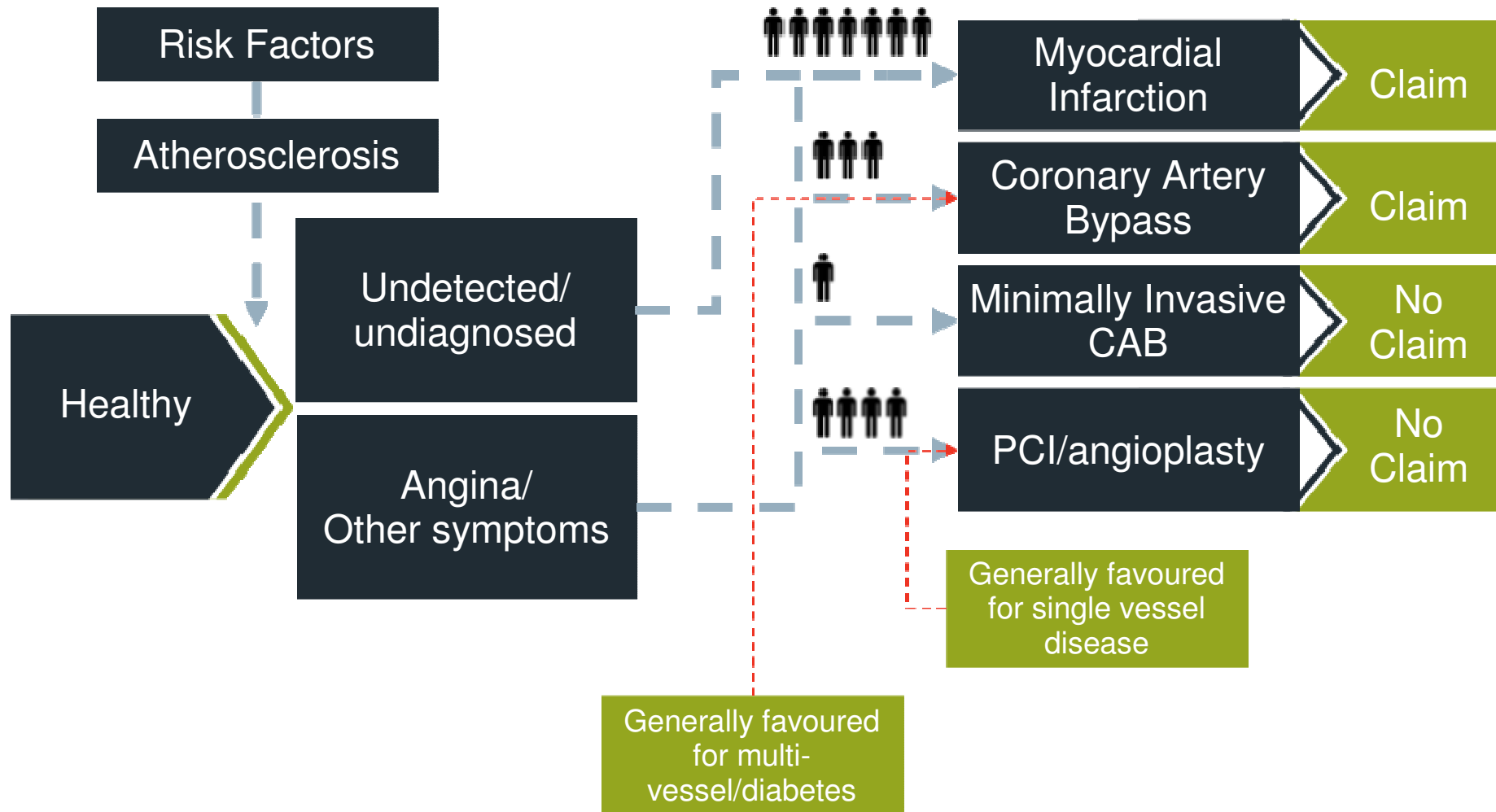
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Section 3: Aaron Tindale

- Heart Valve Replacement or Repair
- Next steps

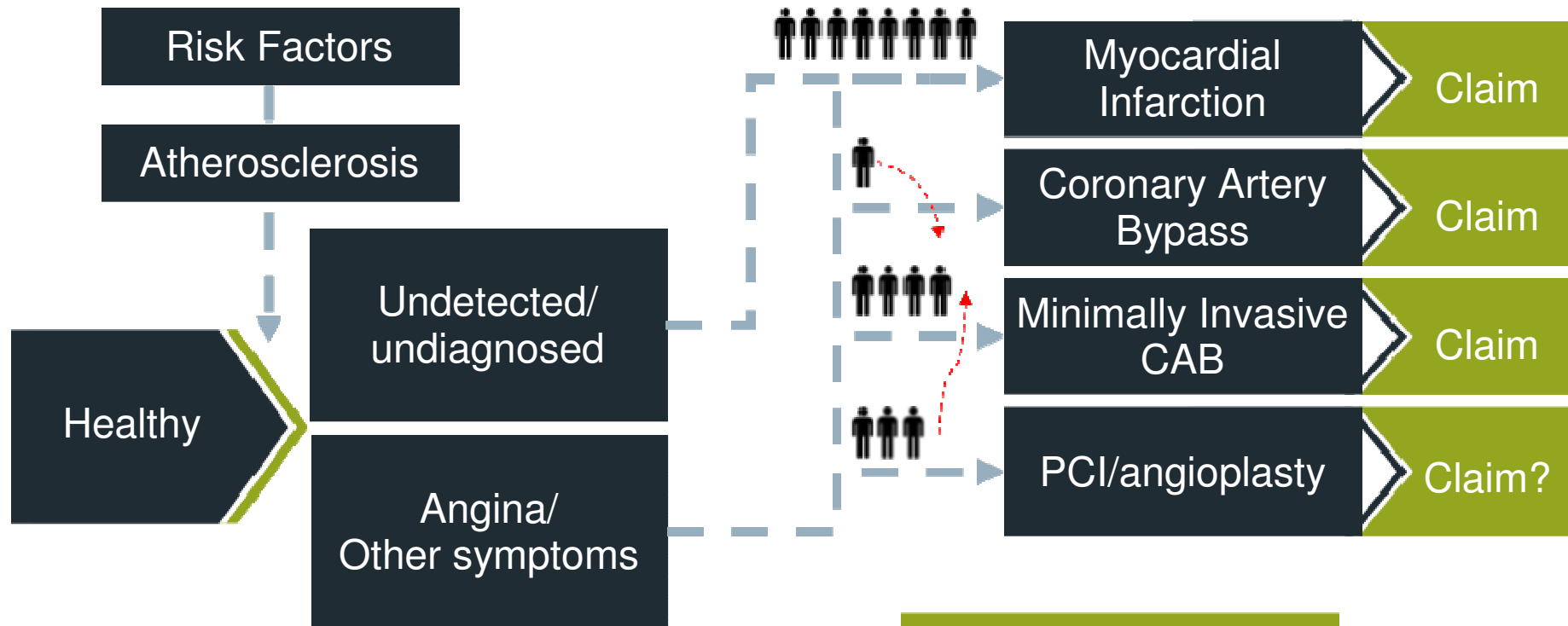
Coronary heart disease: journey to claim

- Standard ABI



Coronary heart disease: journey to claim

- ABI+



What could happen:

- MICAB replaces CAB
- PCI replaces CAB
- MICAB replaces PCI
- New CAB, MICAB, PCI
- More MI detected

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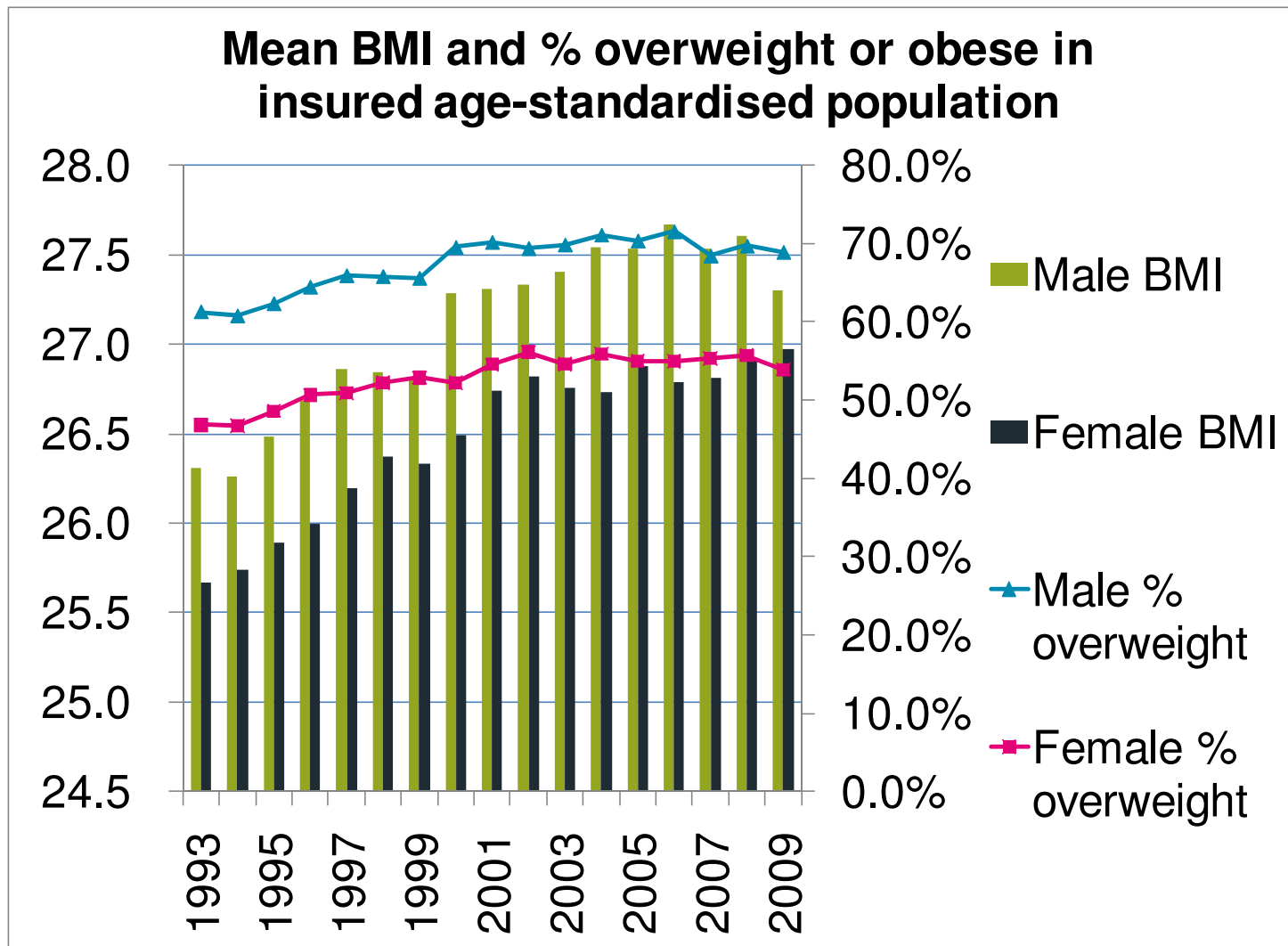
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Heart disease risk factors

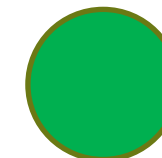
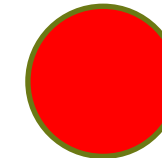
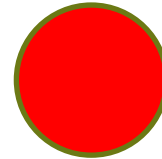
- Obesity
- Hypertension
- Diabetes
- High cholesterol levels
- Sedentary lifestyle
- Smoking

Risk factor trends: *rising obesity levels*



Heart disease risk factors

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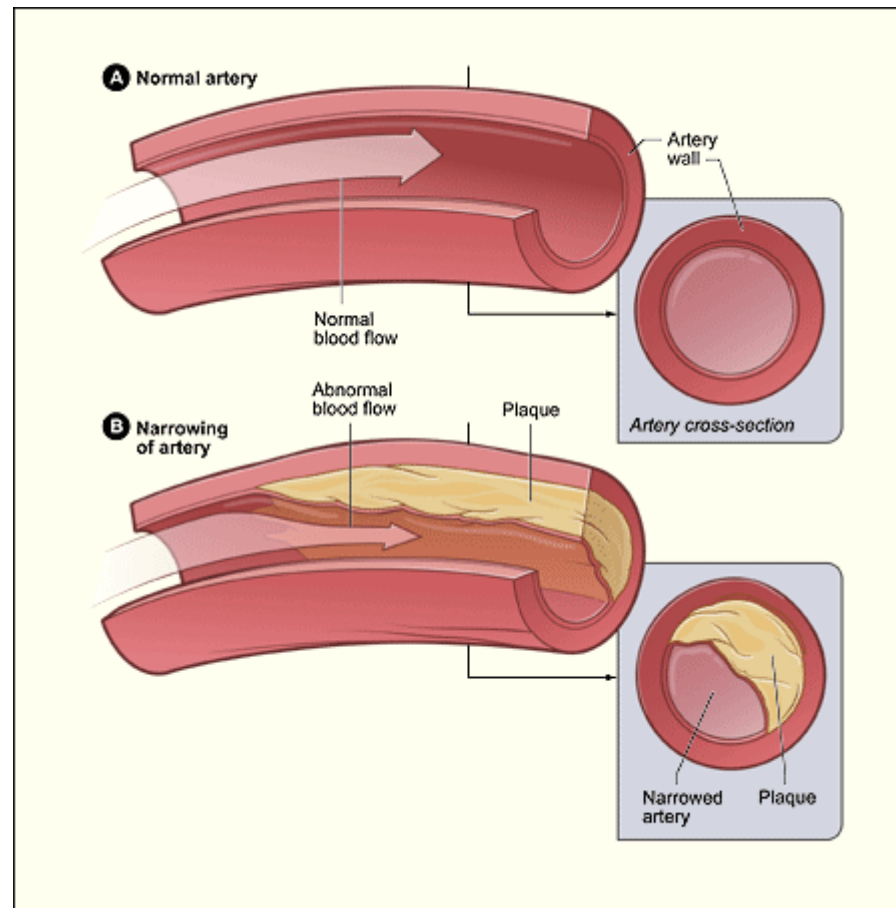
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- Discussion and next steps

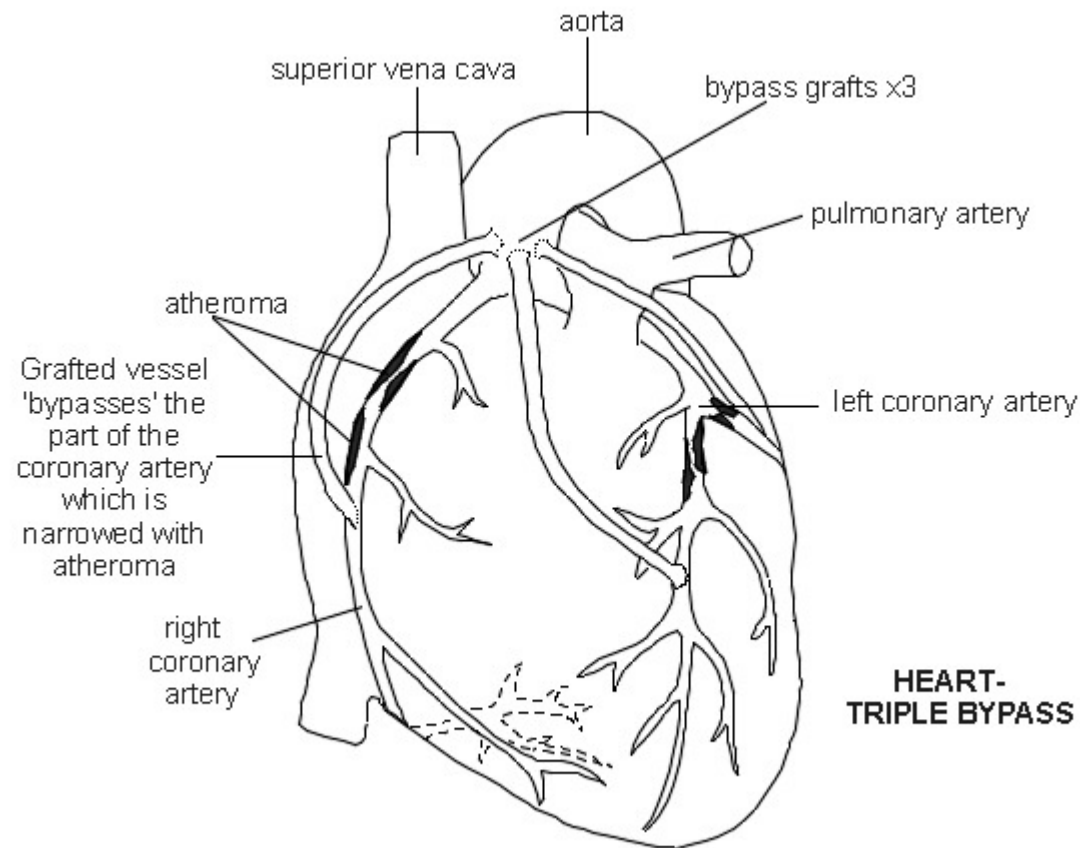
CABG & Angioplasty

- *What are they?*



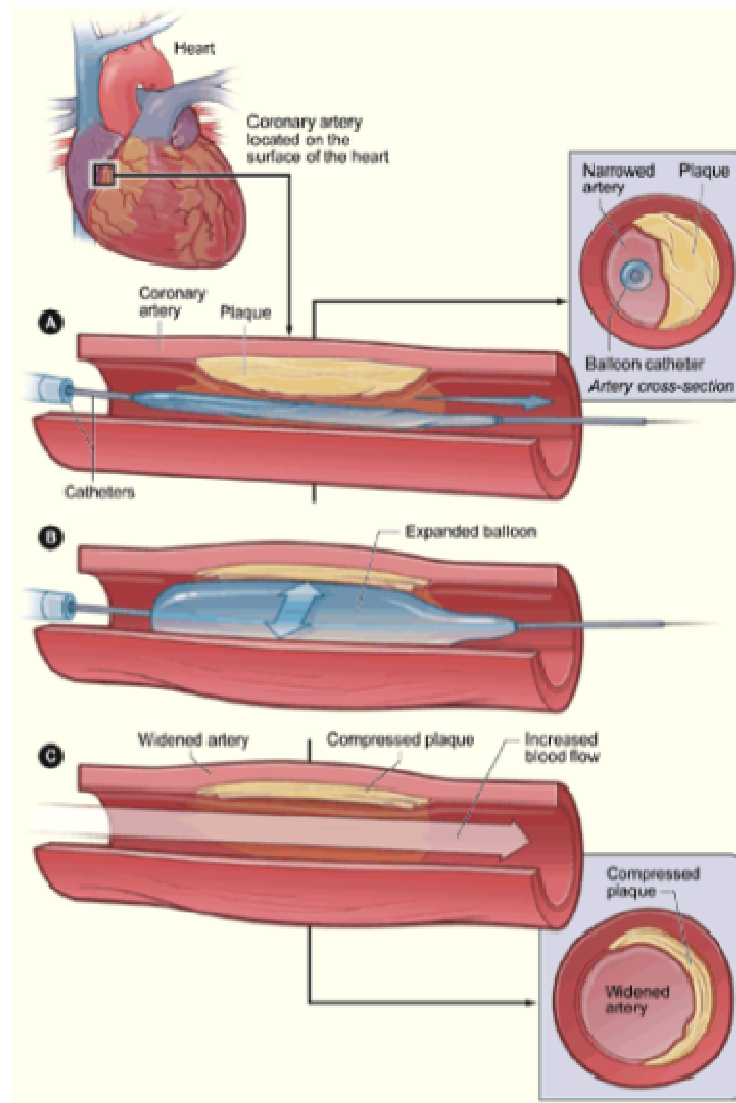
CABG & Angioplasty

- *What are they?*



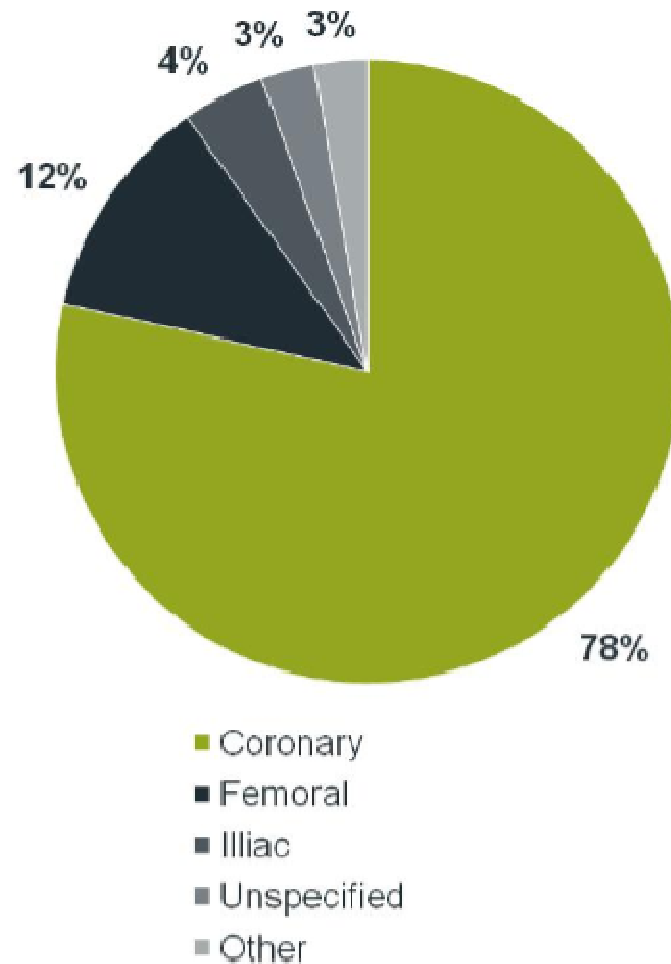
CABG & Angioplasty

- *What are they?*



Angioplasty

A small but sizeable proportion of angioplasties do not relate to the coronary artery ...



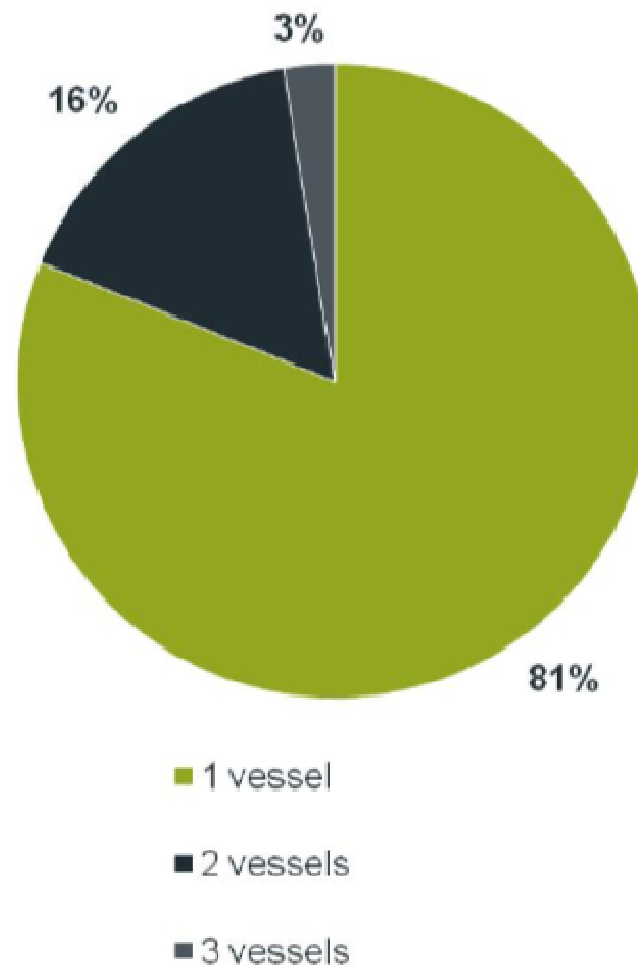
Angioplasty vs CABG

A competition!

The majority of angios are carried out on single vessels...

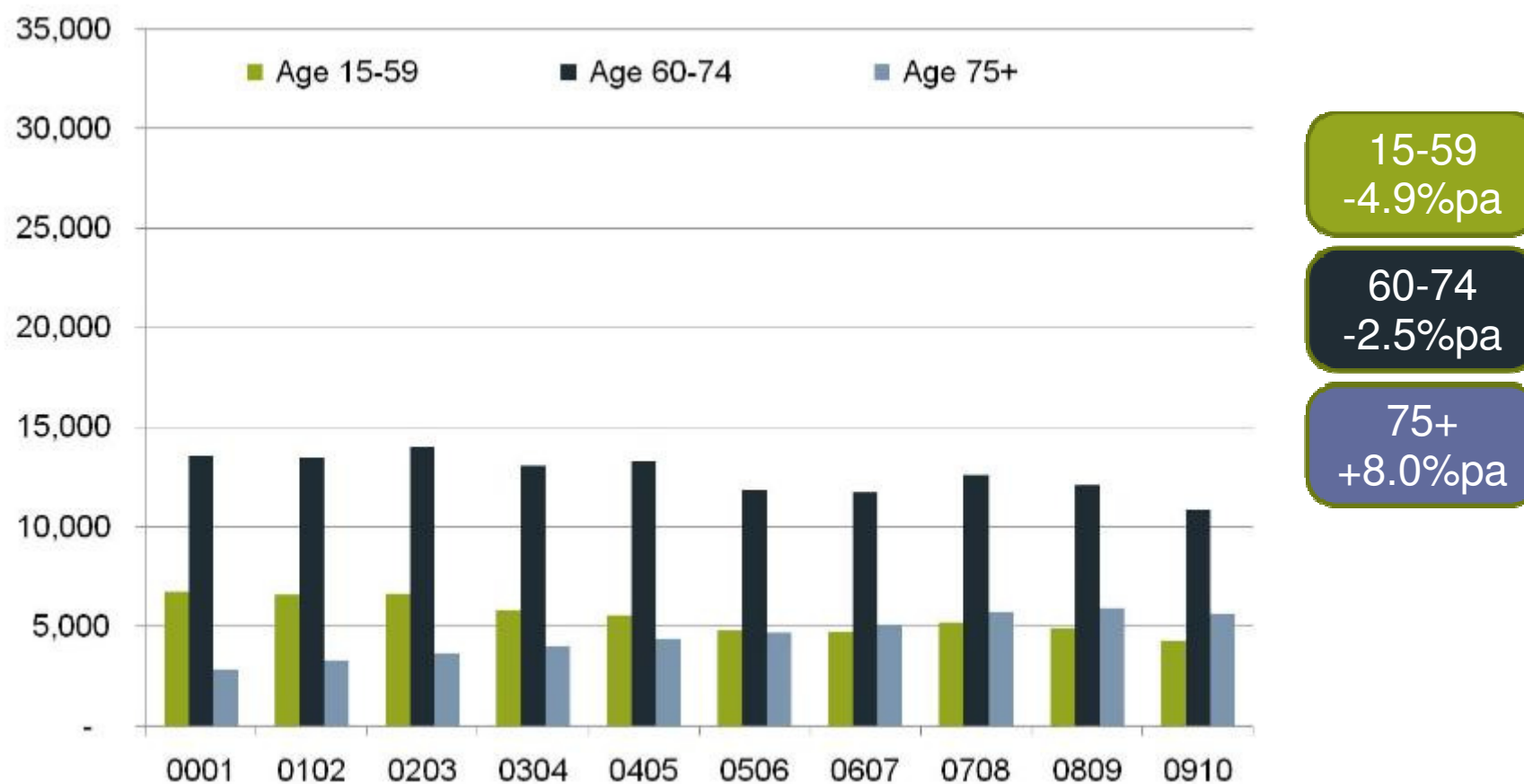
... and this proportion has been slowly rising over recent years

(2009 BCIS Audit data)



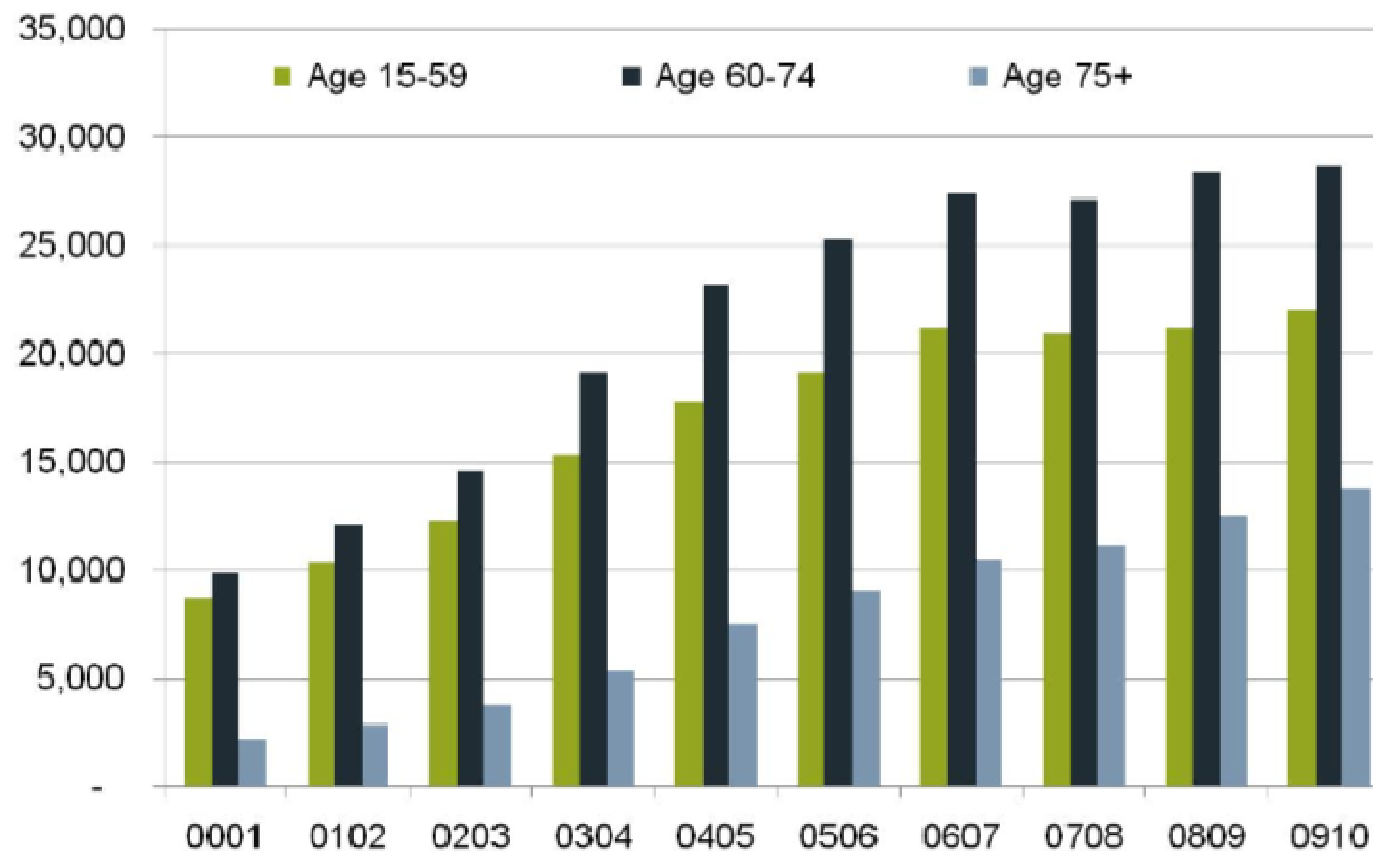
Coronary Artery Bypass Graft

CABG incidence has been falling in the insured age range



Angioplasty

Coronary angioplasty admissions have been rising ...



Angioplasty

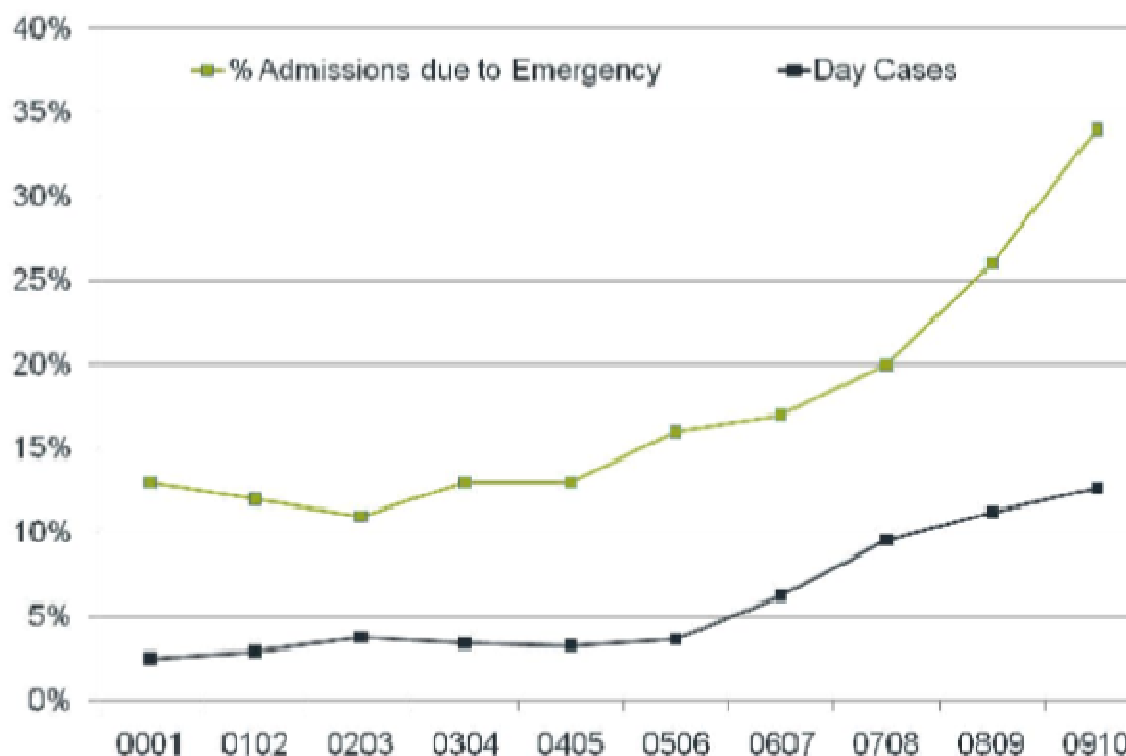
Male incidence has been rising faster than female ...



Angioplasty

Emergency cases may overlap with Heart Attack?

Day cases are unlikely to meet an insured definition?



Insured Definitions & Trend risk

Coronary Angioplasty – non-ABI

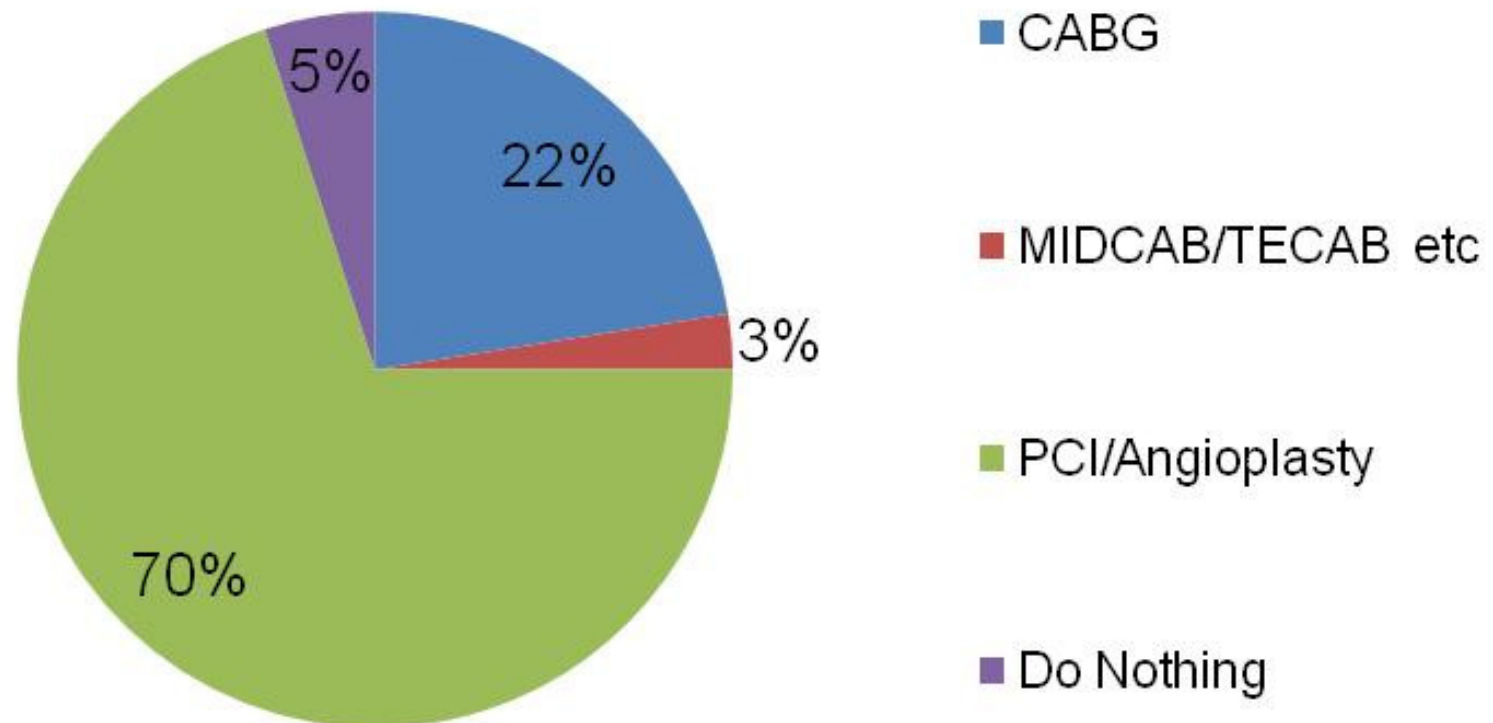
- Severity based definition covering the worst cases:
 - Multi-vessel
 - >70% stenosis

CABG – ABI+

- Removal of median sternotomy opens the door for payouts on new non-invasive techniques

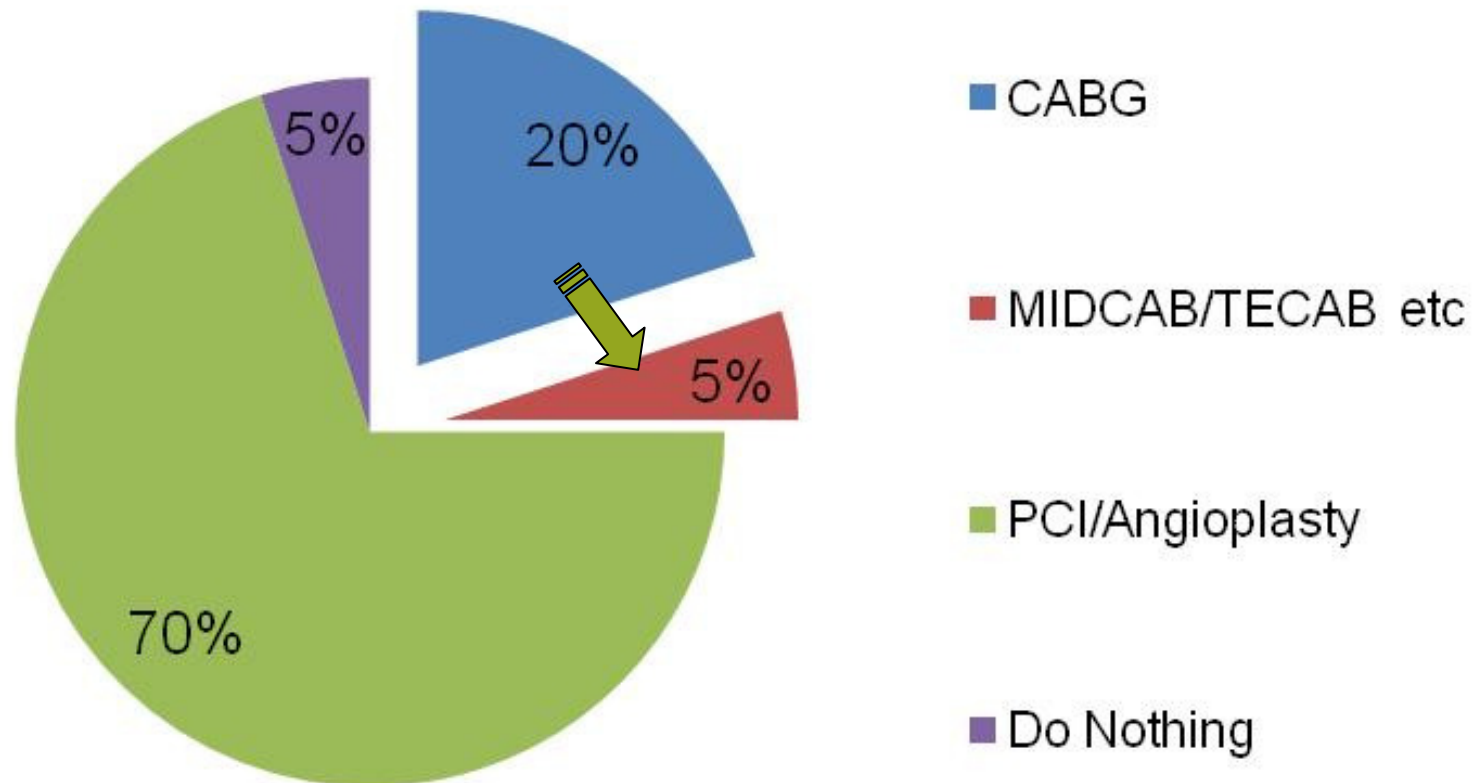
Insured Definitions & Trend risk

Today



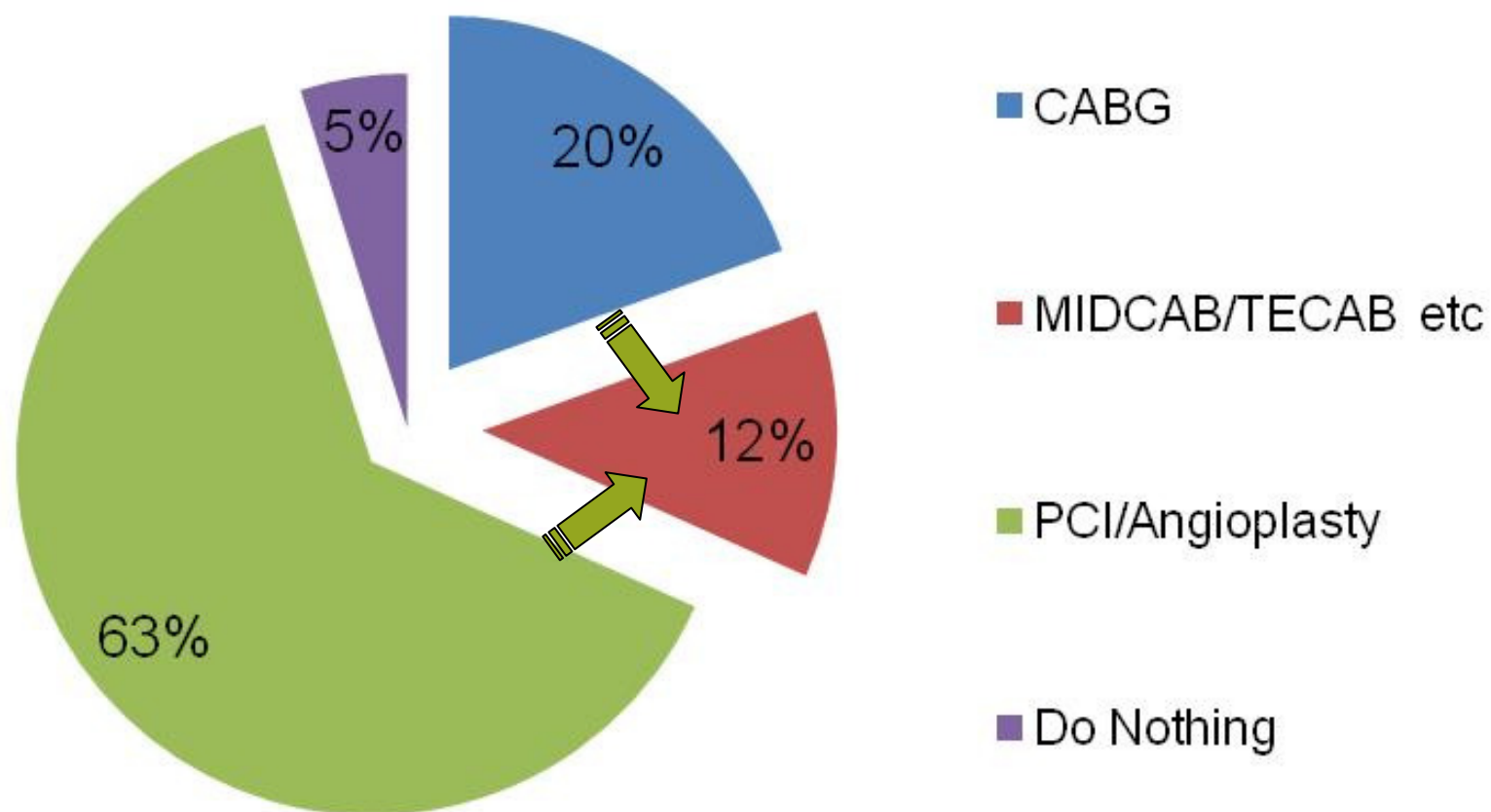
Insured Definitions & Trend risk

Minimally invasive replaces CABG?



Insured Definitions & Trend risk

Minimally invasive replaces CABG & Angio?



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Heart valve replacement or repair definition

ABI

Heart valve replacement or repair – *with surgery to divide the breastbone*

The undergoing of surgery **requiring median sternotomy** (surgery to divide the **breastbone**) on the advice of a Consultant Cardiologist to replace or repair one or more heart valves.

➔ Open heart surgery only

Heart valve replacement or repair definition

ABI+

Heart valve replacement or repair – ~~with surgery to divide the breastbone~~

The undergoing of surgery ~~requiring median sternotomy (surgery to divide the breastbone)~~ on the advice of a Consultant Cardiologist to replace or repair one or more heart valves.

➔ Less invasive surgical techniques also covered

A cross section of the heart

Four chambers

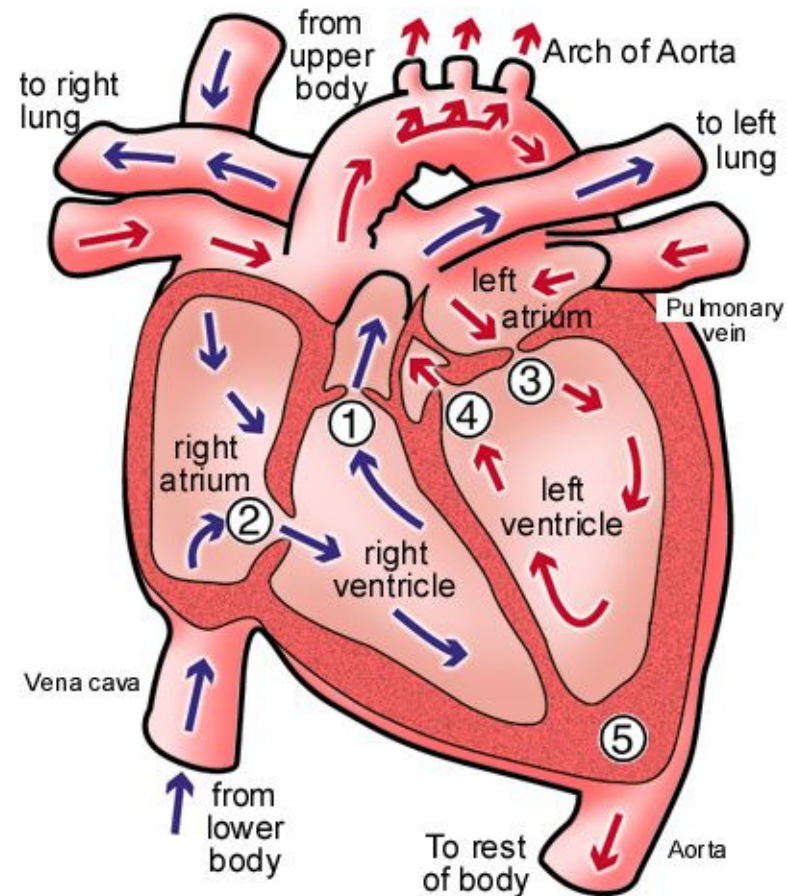
Four valves:

1. Pulmonary

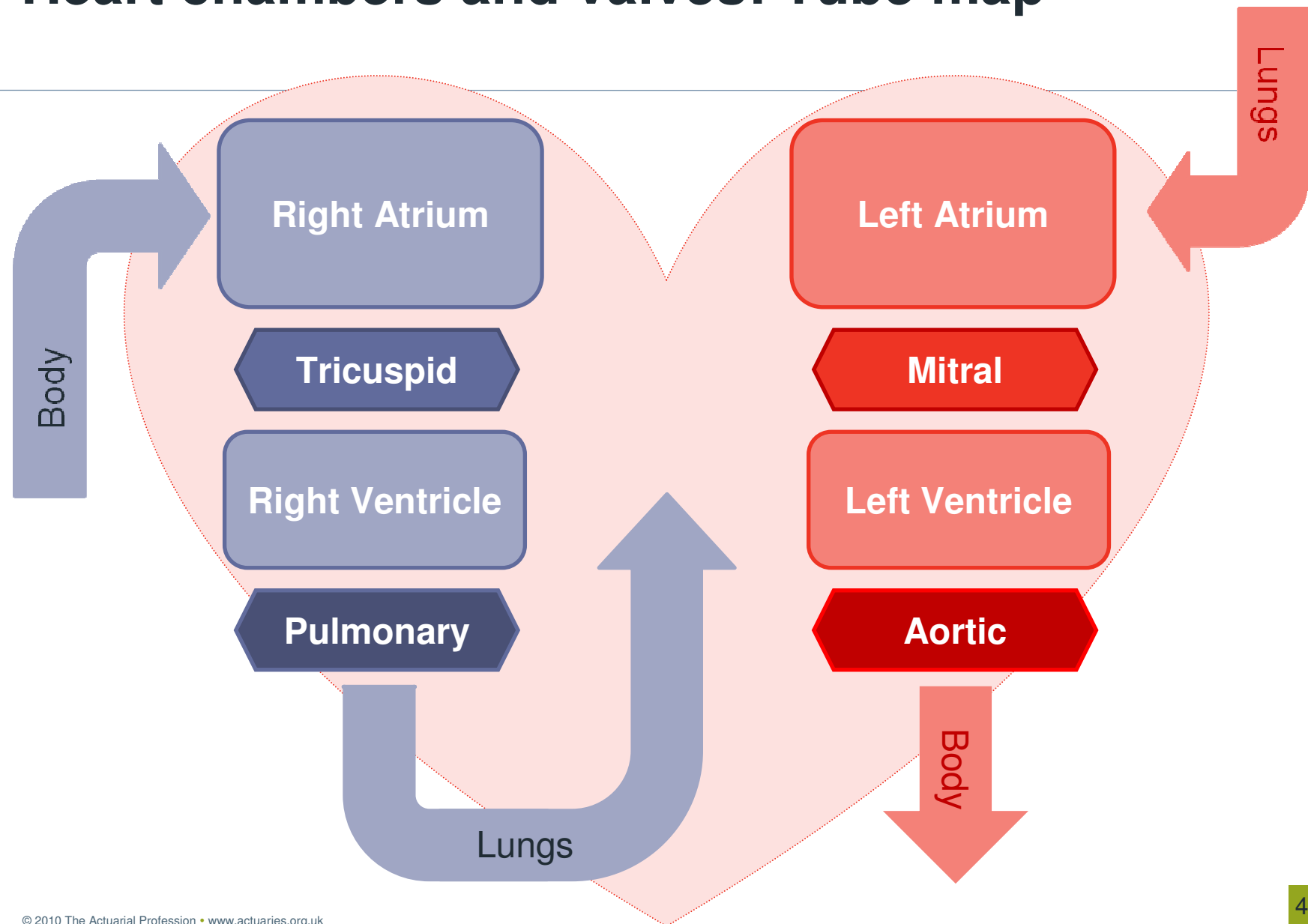
2. Tricuspid

3. Mitral

4. Aortic



Heart chambers and valves: Tube map





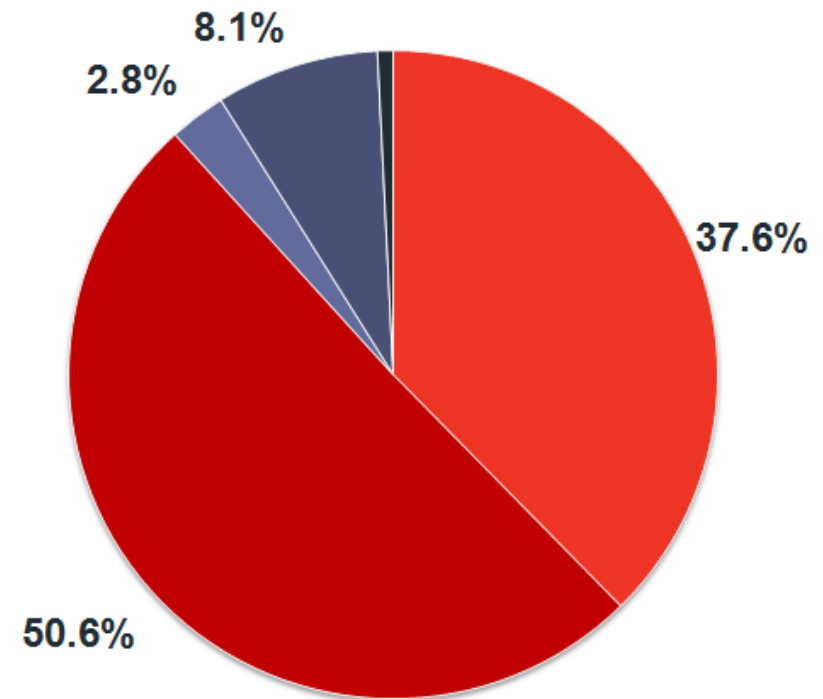
Which valves are operated on?

Left side (Lungs → Body)

- Mitral 
- Aortic 

Right side (Body → Lungs)

- Tricuspid 
- Pulmonary 

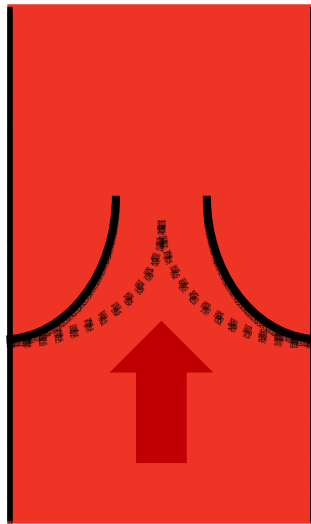


NHS Hospital Episode Statistics for England 2008-09.
Inpatient statistics for ages 15-59

Healthy Heart Valve

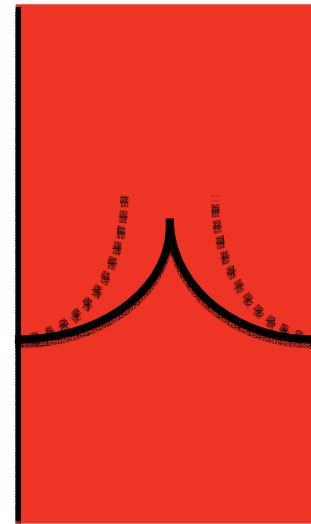
Opened valve

Blood flows out



Closed valve

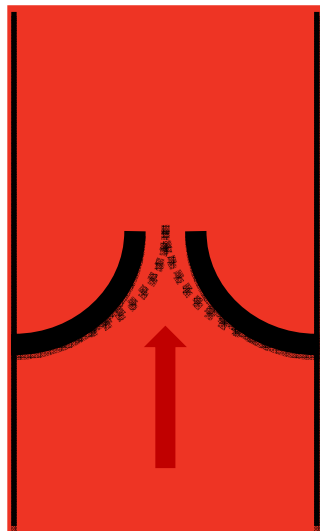
No flow between pumps



Heart Valve Disease

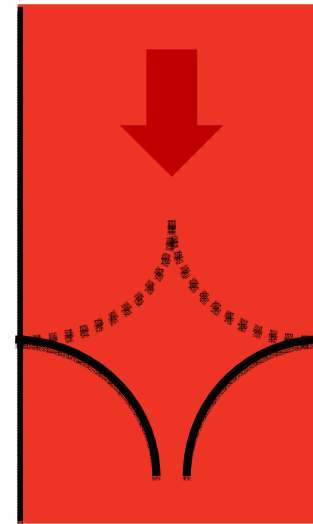
Eg 1. Stenosis

Stiff valve slows blood flow



Eg 2. Prolapse

Blood leaks back into heart chamber between pumps



Heart Valve Disease Risk Factors

Causes of HV disease:

- 1) Specific problems with the heart valves
 - Congenital (birth defect)
 - Damage from rheumatic fever
 - Infection (endocarditis)
 - 2) Calcium build up (age)
 - 3) Broader heart problems that affect the valve function
(Atherosclerosis, Cardiomyopathy)
- ➔ Risk factors are the usual suspects for heart disease

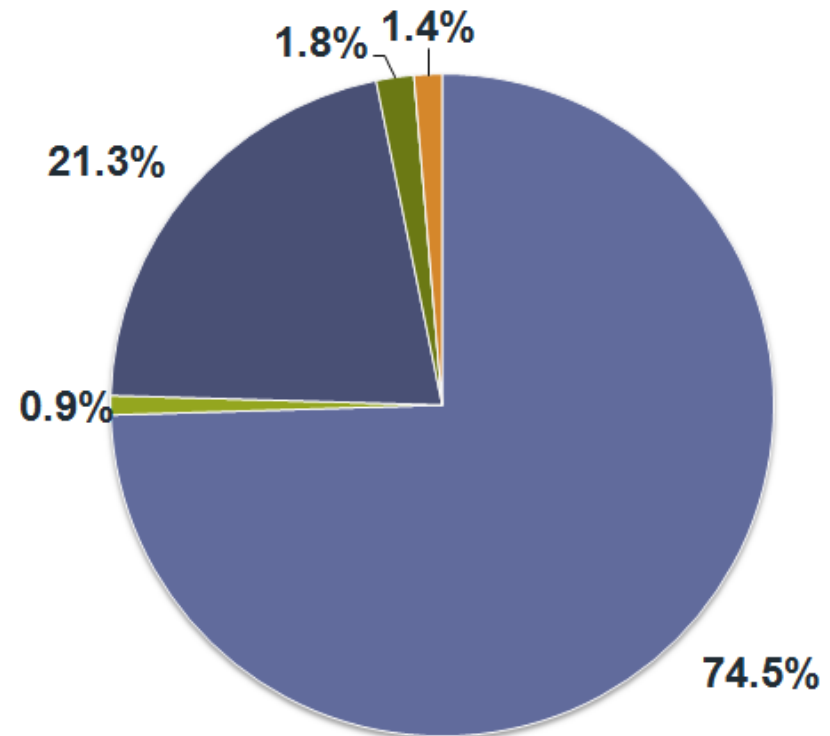
Procedures on faulty valves - Snapshot

Repair

- Open heart surgery **ABI**
- Keyhole surgery **ABI+**
- Valvuloplasty **?**

Replace

- Open heart surgery **ABI**
- Keyhole surgery **ABI+**



NHS Hospital Episode Statistics for England 2008-09.
Inpatient statistics for ages 15-59

Example: Transcatheter valve implants

Artificial valve



On a balloon catheter



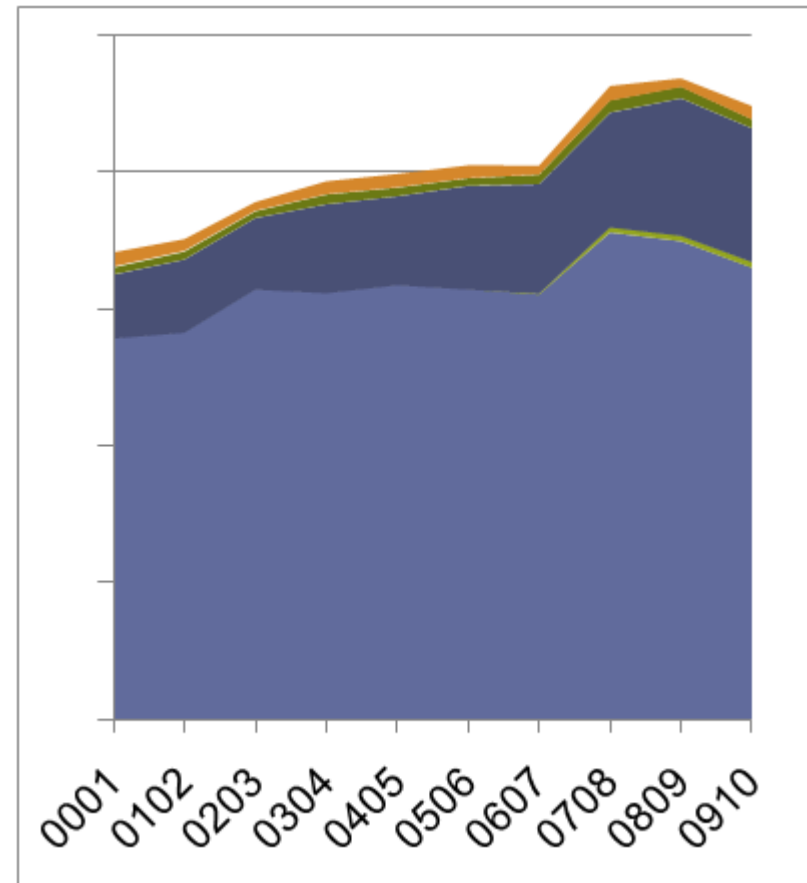
Procedures on faulty valves - Trends

Repair

- Open heart surgery **ABI**
- Keyhole surgery **ABI+**
- Valvuloplasty **?**

Replace

- Open heart surgery **ABI**
- Keyhole surgery **ABI+**



The future of Heart Valve Surgery

- Major advantages of less invasive interventions
 - May have lower mortality
 - Can be performed on weaker patients
 - Typically half the recovery time
 - Potentially cheaper
- Possible future: Look at specialised US clinics
 - Mitral valves nearly all repaired, majority are keyhole
 - Aortic valves normally replaced, some keyhole
- Require greater expertise and experience

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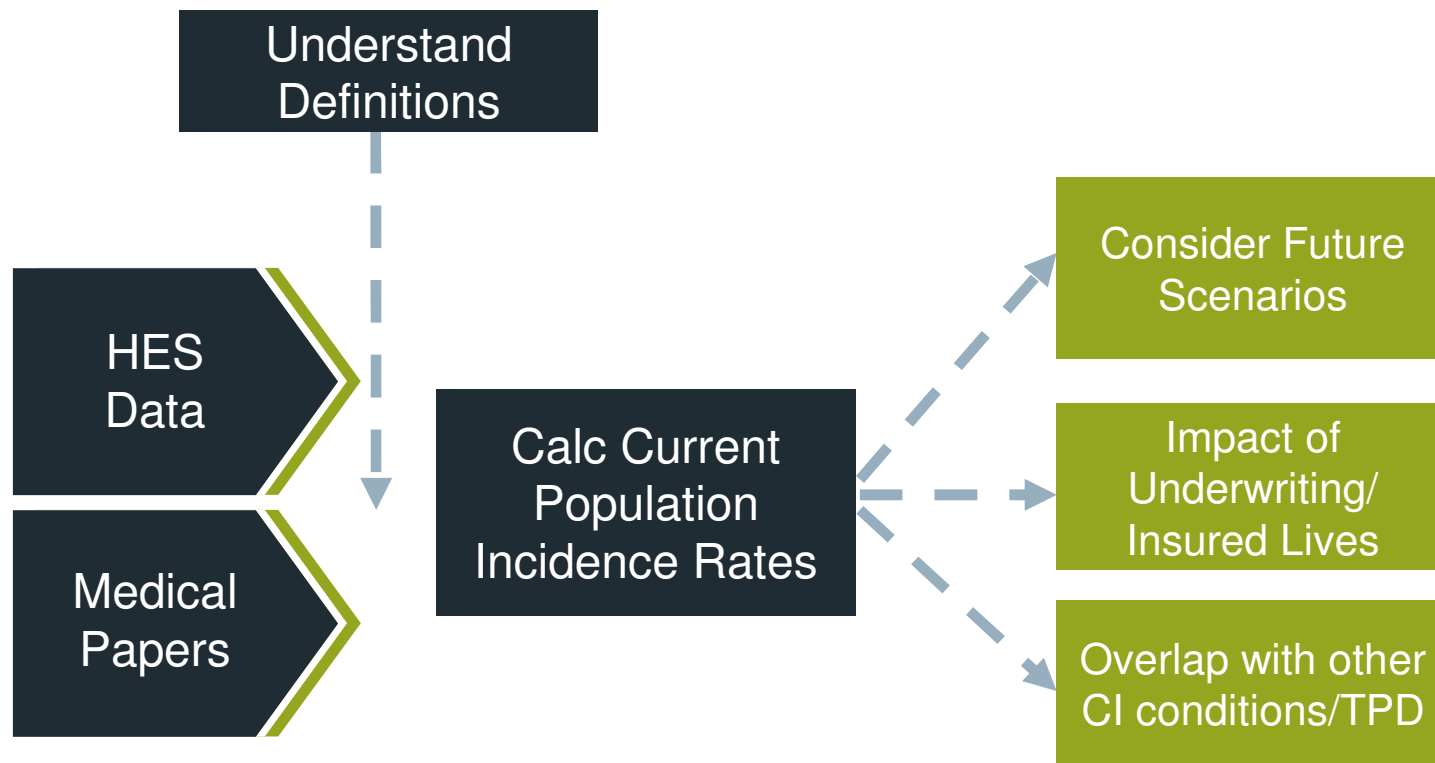
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- **Next steps**

Methodology (again)



Next steps

- HES data in a couple of months
- Analyse and continue doing other definitions
- Present initial analysis at CIIHC
- Paper in 2012

Questions or comments?

Expressions of individual views by members of The Actuarial Profession and its staff are encouraged.

The views expressed in this presentation are those of the presenters.

