

Diagnosing heart failure in primary care

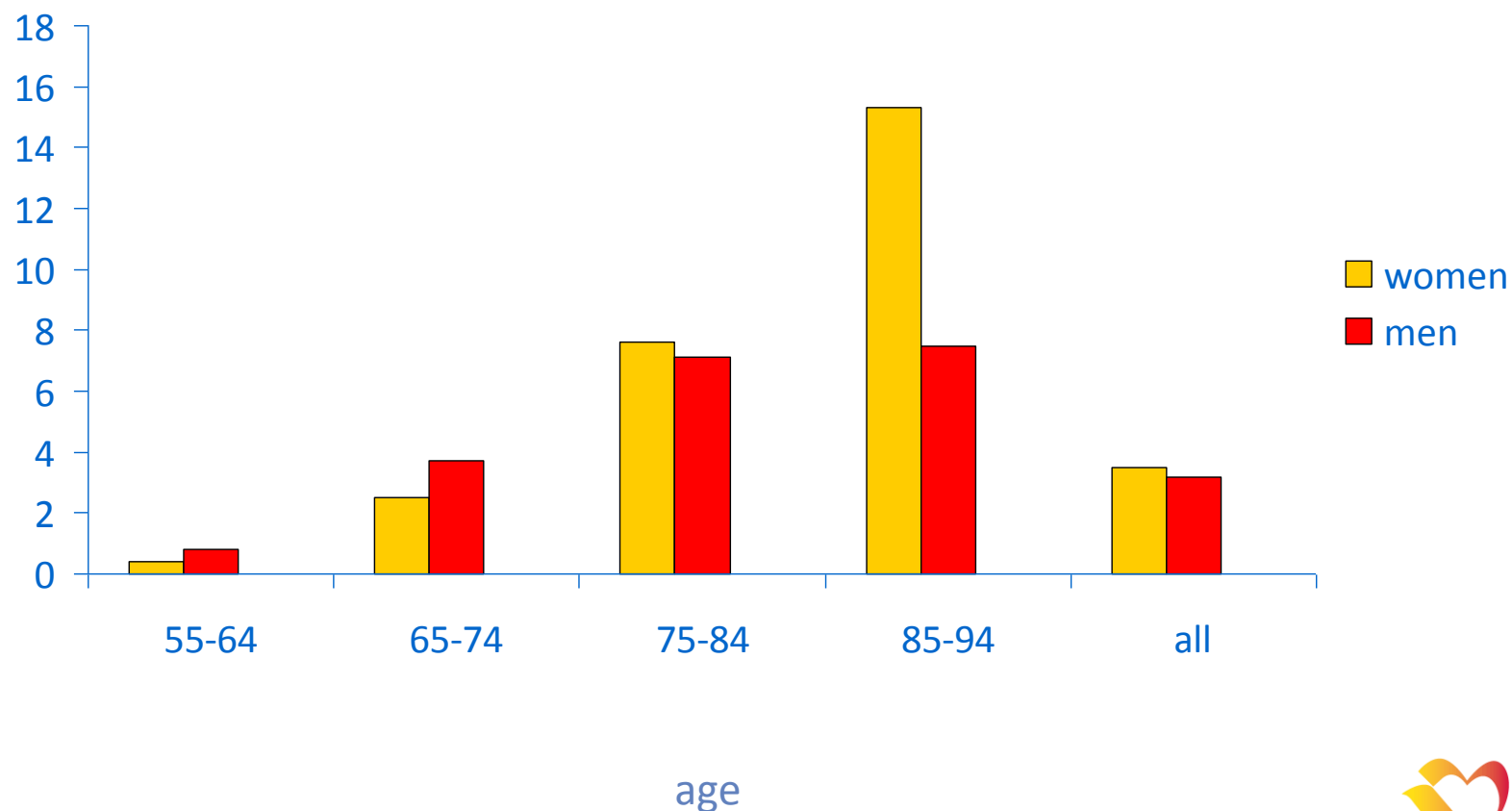
Arno W. Hoes, MD, PhD, FESC

Julius Center for Health Sciences and Primary care
University Medical Center Utrecht



Prevalence of heart failure

Rotterdam Study (n=5,540)



Heart failure: definition 2012

Table 1 Diagnosis of heart failure

The diagnosis of HF-REF requires three conditions to be satisfied:

1. Symptoms typical of HF
2. Signs typical of HF^a
3. Reduced LVEF

The diagnosis of HF-PEF requires four conditions to be satisfied:

1. Symptoms typical of HF
2. Signs typical of HF^a
3. Normal or only mildly reduced LVEF and LV not dilated
4. Relevant structural heart disease (LV hypertrophy/LA enlargement) and/or diastolic dysfunction (see Section 4.1.2)

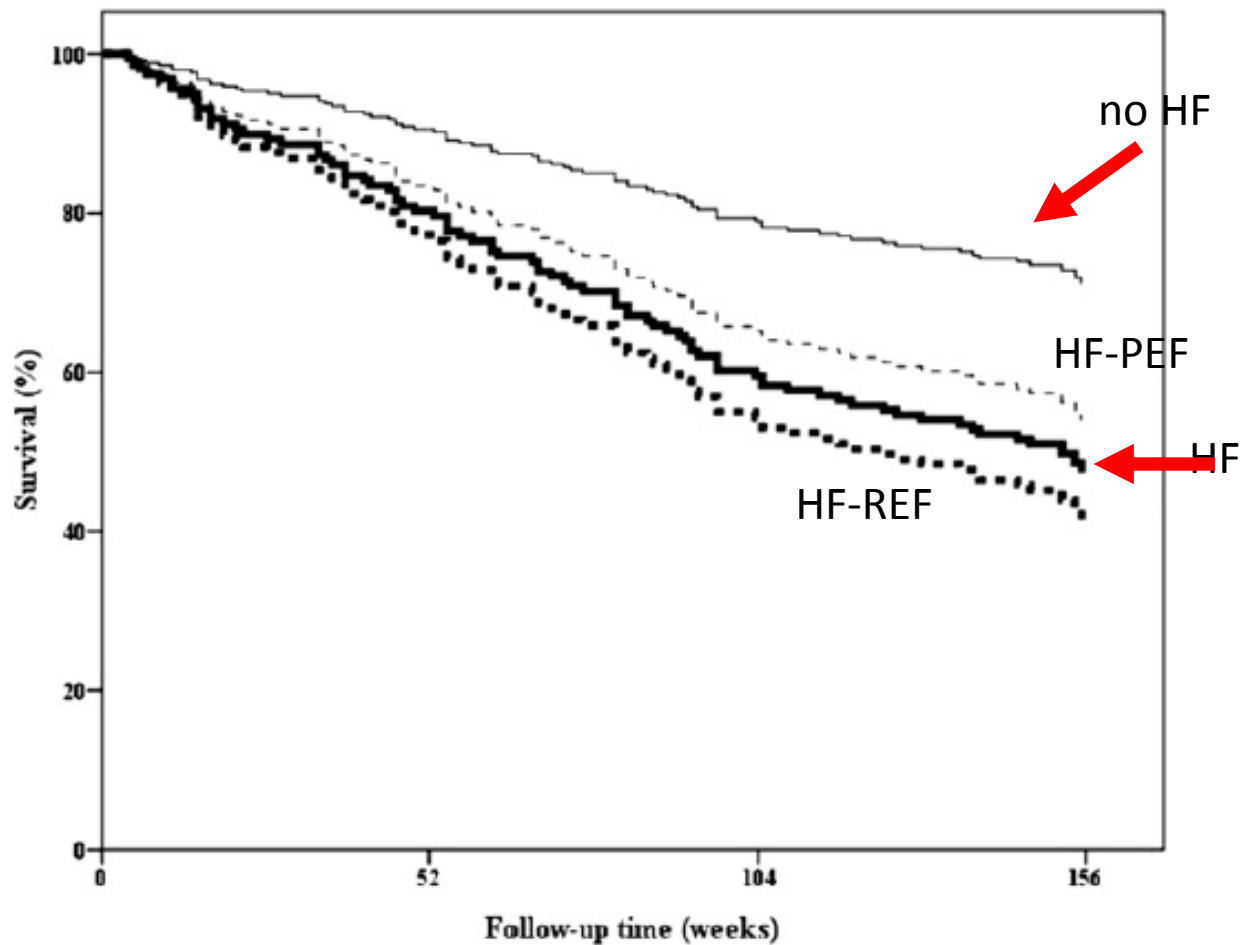
HF = heart failure; HF-PEF = heart failure with 'preserved' ejection fraction; HF-REF = heart failure and a reduced ejection fraction; LA = left atrial; LV = left ventricular; LVEF = left ventricular ejection fraction.

^aSigns may not be present in the early stages of HF (especially in HF-PEF) and in patients treated with diuretics (see Section 3.6).

- acute onset

- slow onset

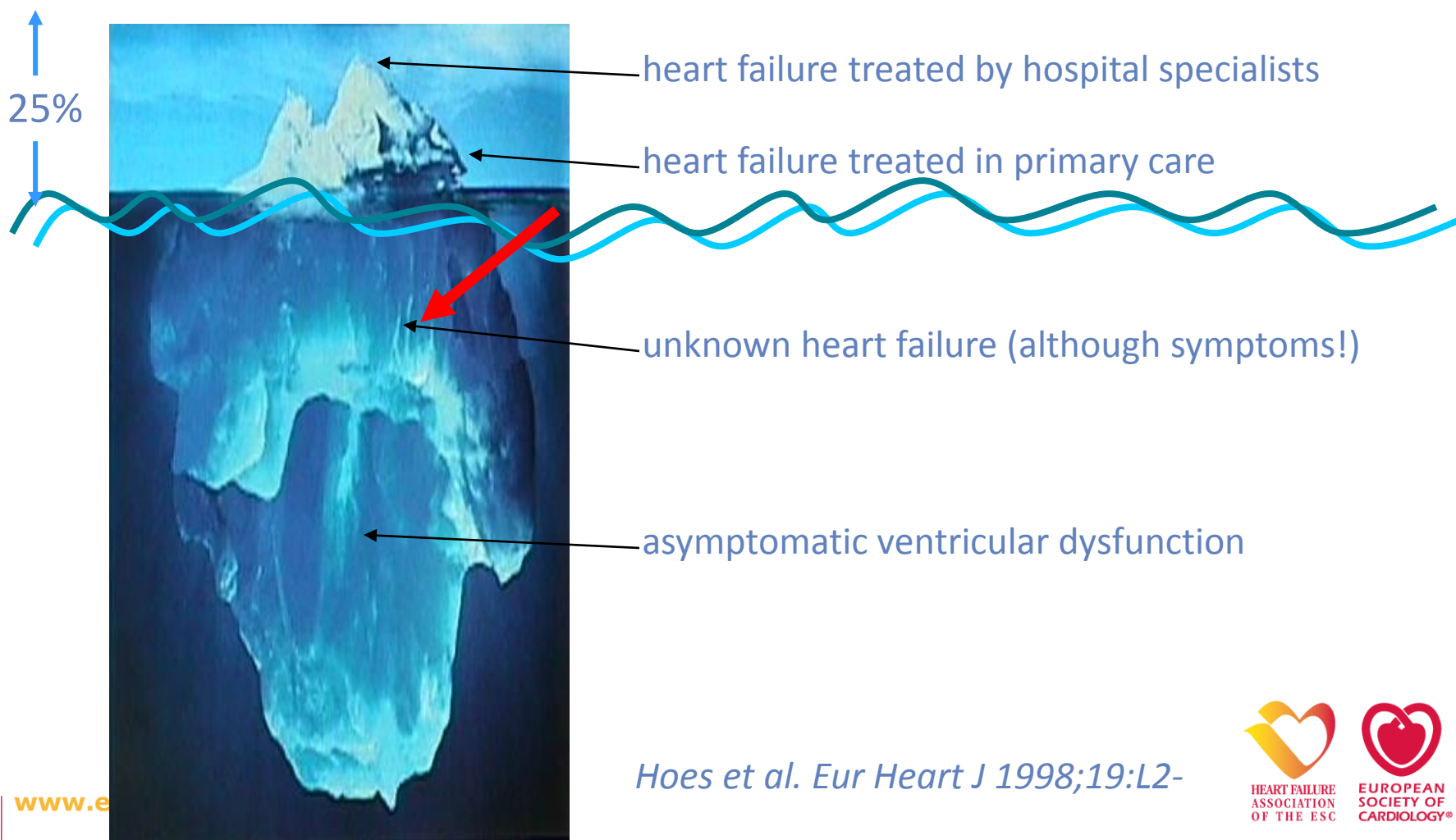
Prognosis is poor, especially in the elderly



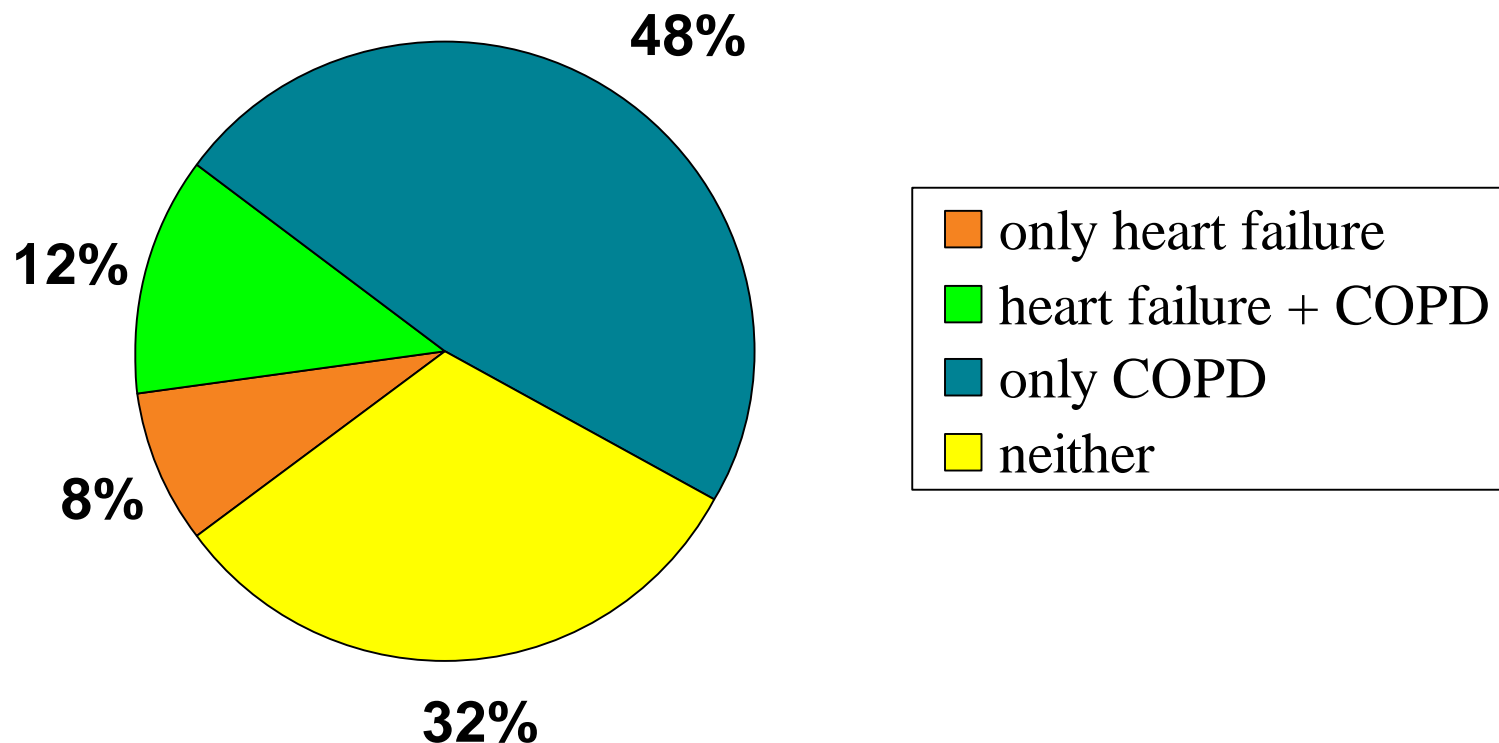
Early detection is crucial

1. *case-finding* in high-risk groups?
2. *diagnosing / recognition* in those presenting complaints
 - patients often do not visit doctor with HF complaints
"part of ageing"
 - doctors often do not recognise HF at consultations
atypical presentation, co-morbidity
 - patients usually presented to primary care/non-cardiologists

Apologies for yet another iceberg!



Case-finding in COPD patients?



Case-finding in diabetes ?



- 605 patients > 60 years
- 31% heart failure (of which 87% unknown)
- unknown heart failure: 83% HF-PEF !!!

Diagnosing HF in those presenting complaints

- female 78 years
- *slowly* increasing shortness of breath
- osteoarthritis since 1995
- now and again bronchitis
- myocardial infarction in 2000
- very successful smoker (> 60 pack years)
- 25th hypertension anniversary
- she hates hospitals



Symptoms and signs

Table 4 Symptoms and signs typical of heart failure

| Symptoms | Signs |
|--|---|
| <i>Typical</i> | <i>More specific</i> |
| Breathlessness | Elevated jugular venous pressure |
| Orthopnoea | Hepatojugular reflux |
| Paroxysmal nocturnal dyspnoea | Third heart sound (gallop rhythm) |
| Reduced exercise tolerance | Laterally displaced apical impulse |
| Fatigue, tiredness, increased time to recover after exercise | Cardiac murmur |
| Ankle swelling | |
| <i>Less typical</i> | <i>Less specific</i> |
| Nocturnal cough | Peripheral oedema (ankle, sacral, scrotal) |
| Wheezing | Pulmonary crepitations |
| Weight gain (>2 kg/week) | Reduced air entry and dullness to percussion at lung bases (pleural effusion) |
| Weight loss (in advanced heart failure) | Tachycardia |
| Bloated feeling | Irregular pulse |
| Loss of appetite | Tachypnoea (>16 breaths/min) |
| Confusion (especially in the elderly) | Hepatomegaly |
| Depression | Ascites |
| Palpitations | Tissue wasting (cachexia) |
| Syncope | |

Anecdote- or authority-based medicine?

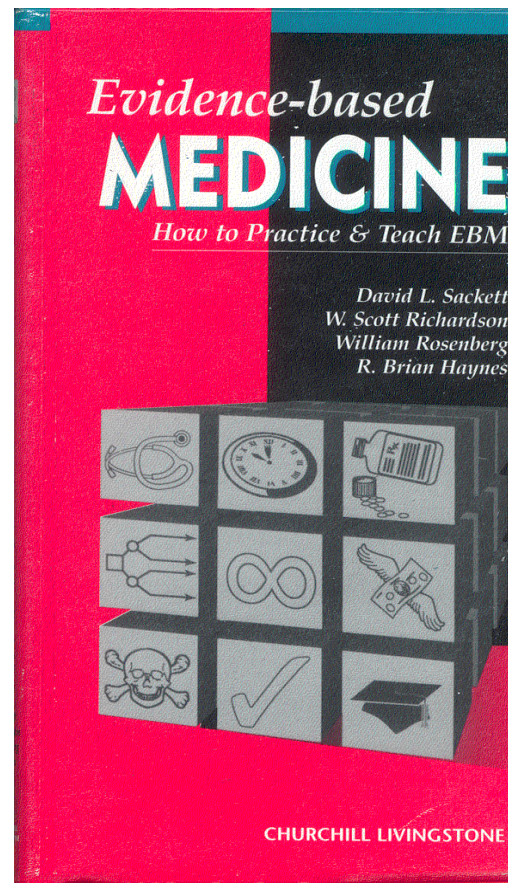
The cardiologist

“caused by the aortic valve: does your stethoscope still work?”

The general practitioner

“ever heard of COPD? (by the way: in the same thorax)”

What about the evidence?



Clinically relevant diagnostic research



1. Relevant clinical: *real* patients
 - diagnosis: patients suspected of disease in relevant setting
2. Multiple tests and *added* value more complicated tests
 - no diagnosis is set by means of just one test
 - i.e. in addition to what is routinely available anyway
3. Results easily applicable in daily practice
 - eg score, risk estimates, algorithms
 - eg logistics, costs

Example: UHFO-DD study



Optimal diagnostic strategy in primary care?

- 728 suspected patients in primary care (non-acute onset)
- mean age 71
- diagnostic out-patient clinics in 8 hospitals
- diagnostic cocktail plus 6 months follow-up
- reference standard expert panel: 28% heart failure

Importance of physical examination!

age

MI, CABG, PTCA

displaced apex beat !

pulmonary rales !

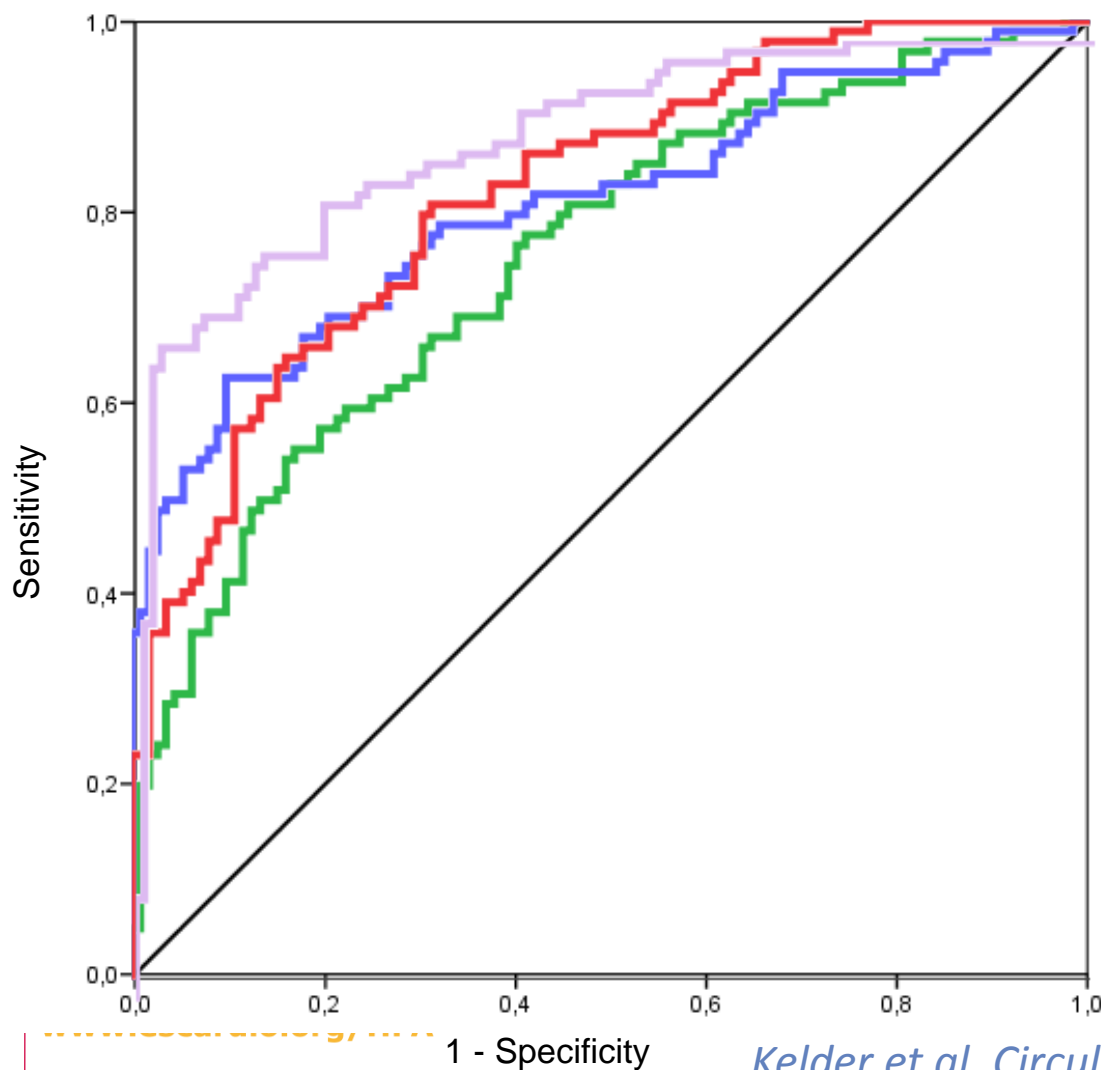
heart murmur !

elevated jugular pressure !



AUC > 0.75!

NT-proBNP in suspected 728 non-acute patients



| | AUC |
|---------------------|------|
| Signs, symptoms | 0.75 |
| SS plus ECG | 0.83 |
| SS plus chest X-ray | 0.84 |
| SS plus NTproBNP | 0.86 |

Diagnostic score with probabilities

| Diagnostic variables | Score | Score | Prevalence HF (%) |
|-------------------------|-------|-------|-------------------|
| age | 0-10 | | |
| MI, CABG, PCI | 15 | 0 | 1% |
| loop diuretic | 10 | 20 | 10% |
| displaced apex beat | 20 | 40 | 40% |
| rales | 14 | 80 | 90% |
| irregular pulse | 11 | | |
| jugular vein pressure ↑ | 12 | | |
| heart rate | >60/3 | | |
| NT-proBNP | 0-48 | | |

17 euro per test



Kelder et al. Circulation 2011; 124:2865-

A diagnostic algorithm: MICE rule referral for echocardiography in suspected HF

In a patient presenting with symptoms such as breathlessness in whom heart failure is suspected, refer straight to echocardiography if the patient has any one of:

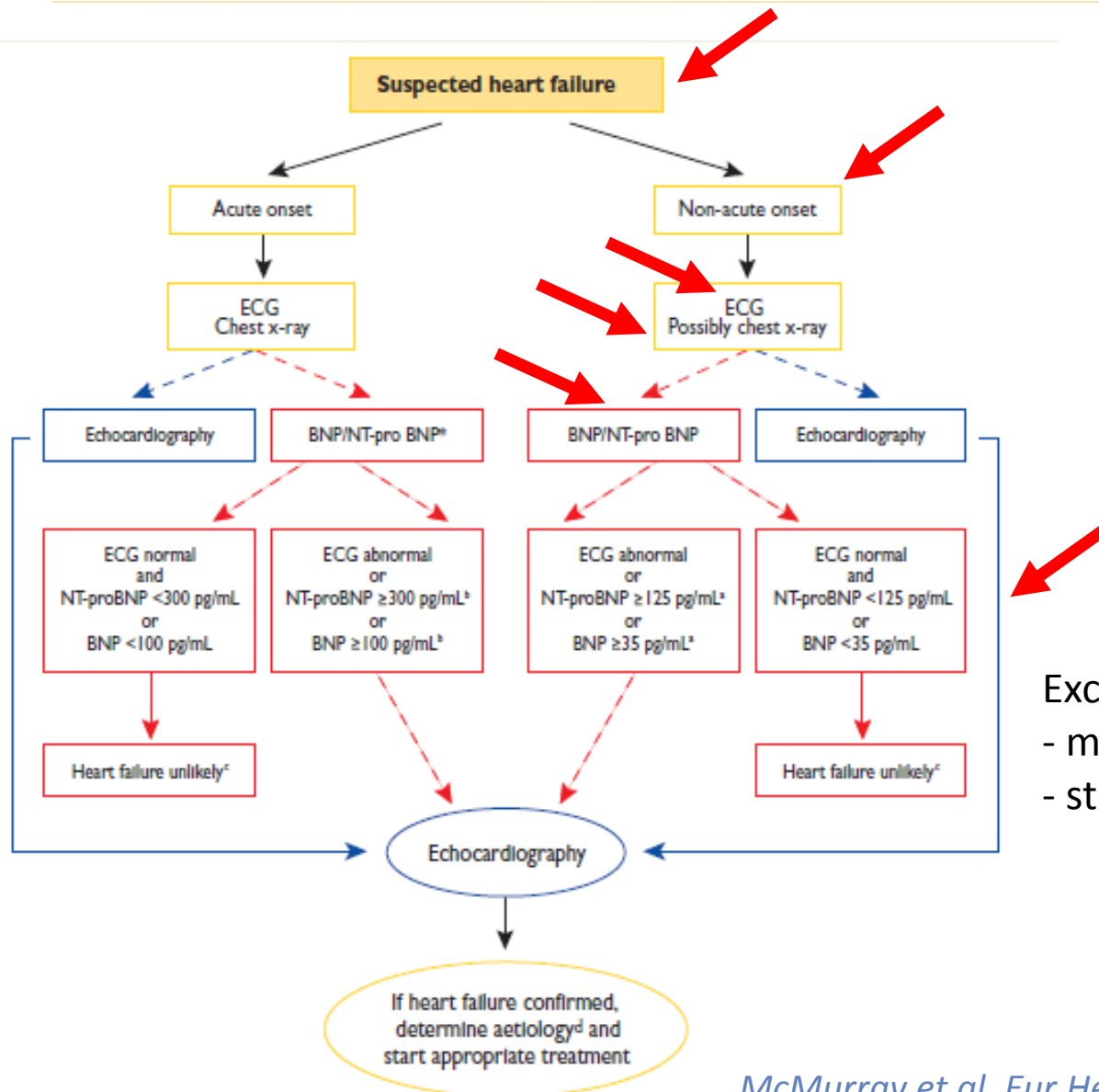
- history of myocardial infarction OR
- basal crepitations OR
- male with ankle oedema



Otherwise, carry out a natriuretic peptide test, and refer for echocardiography depending on the results

MICE: Male, Infarction, Crepitations, Edema

Diagnostic algorithm: 2012 ESC/HFA guidelines



Exclusion cut-off point to
- minimize false-negatives
- still reducing unnecessary referrals

BNP in patients suspected of non-acute HF



Studies on the optimal exclusionary cut-point for BNP in patients *suspected of non-acute new HF*

| Study | Patients (n) | Prevalence (prior chance) of HF or LV systolic dysfunction (%) | 'Optimal' cut-point (pg/mL) ^a | NPV (%) | PPV (%) |
|--|-----------------|--|--|------------|------------|
| <u>Zaphiriou et al⁴¹</u> | 306 | 34 | 30 | 93 | 46 |
| <u>Cowie et al⁴⁵</u> | 127 | 33 | 78 | 98 | 70 |
| <u>Krishnaswamy et al⁴⁶</u> | 400 | 63 | 62 | 85 | 90 |
| <u>Yamamoto et al⁴⁴</u> | 466 | 11 | 37 | 96 | 21 |
| <u>Fuat et al⁴³</u> | 297 | 38 | 40 | 88 | 49 |
| <u>Kelder et al^{47, 48}</u> | 276 | 31 | cut-off 35 35 | 96 | 36 |

^aTo convert BNP pg/mL to pmol/L, multiply by 0.289

LV = left ventricular; HF = heart failure; NPV = negative predictive value; PPV = positive predictive value.

Conclusions



- early diagnosis HF can and should improve
- signs & symptoms: more accurate than often believed
- additional tests: (NT-pro)BNP most valuable
- diagnostic score / algorithm available for daily practice !
- ... it's a tool, albeit an important tool !

