

NT-proBNP: Evidence-based application in primary care

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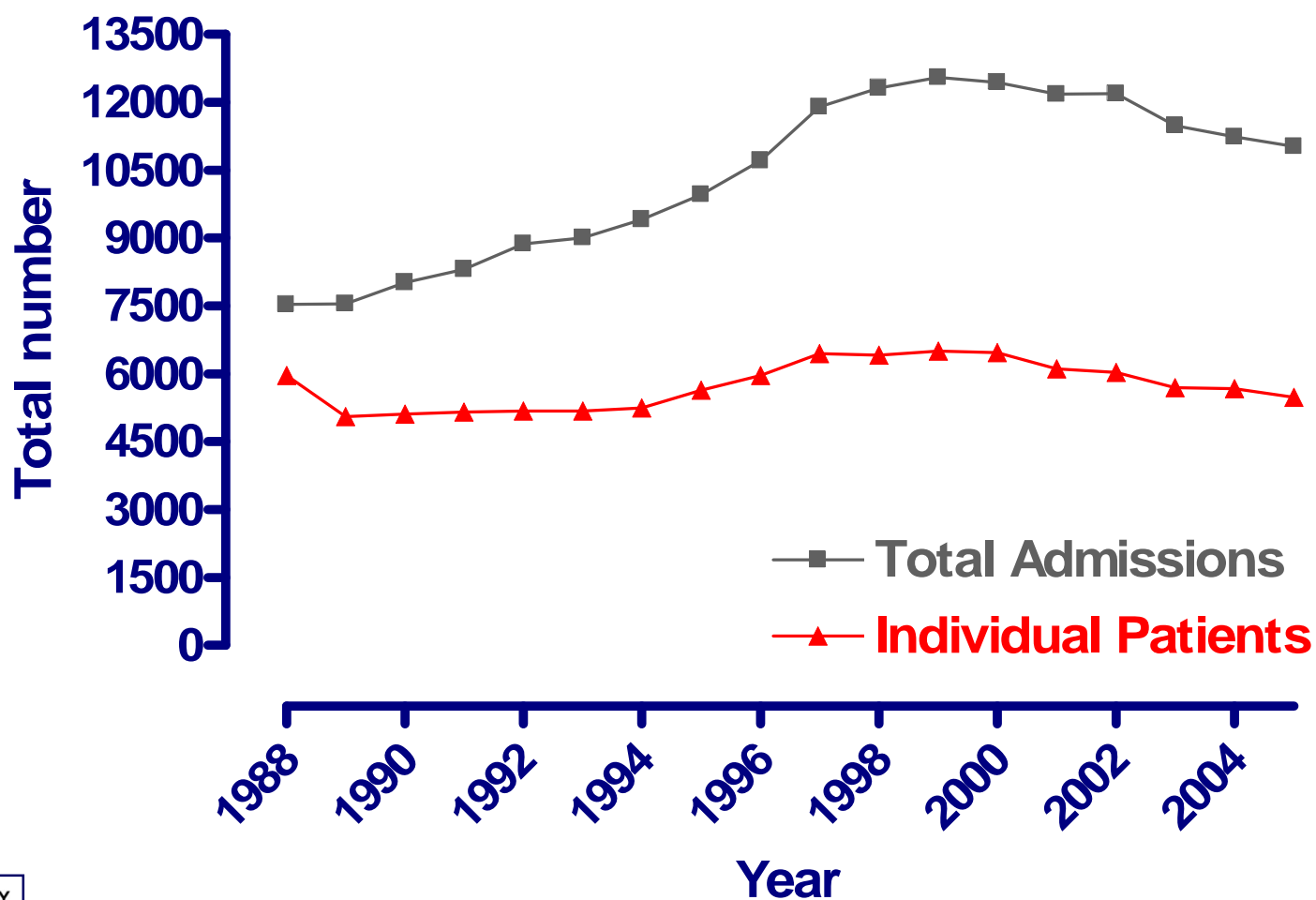
*Clinical Excellence Through
Research and Education*

NT-proBNP: Evidence in Primary Care

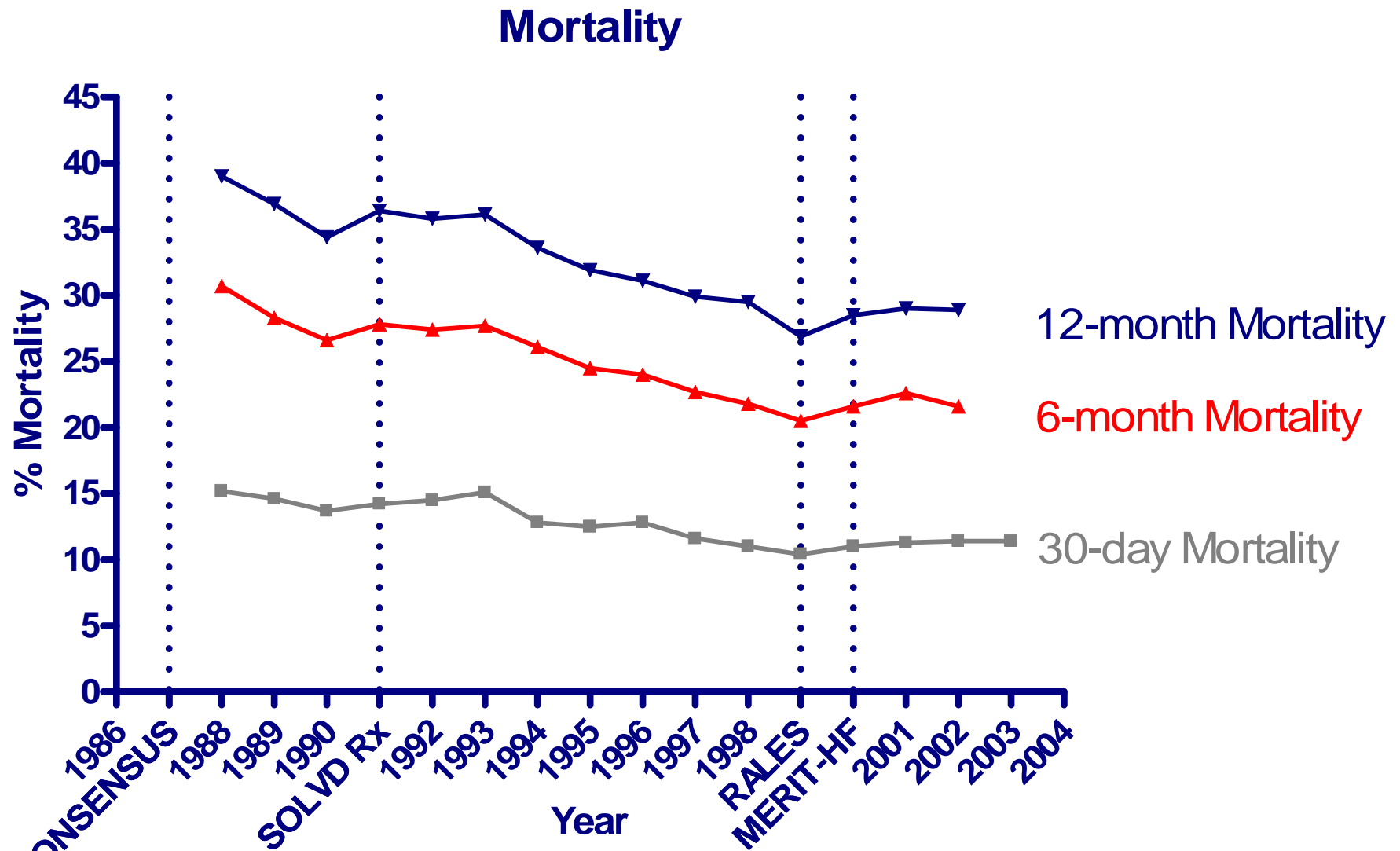
- **The problem of heart failure**
- **Role of echocardiography**
- **How is HF diagnosed**
- **What is brain natriuretic peptide**
- **Cases / Questions**

Heart Failure in NZ

Admissions and Patients 1988-2005



Heart Failure in NZ



Definition of Heart Failure

A clinical syndrome

1. Symptoms of heart failure *and*

2. Cardiac dysfunction

(systolic, diastolic, valvular)

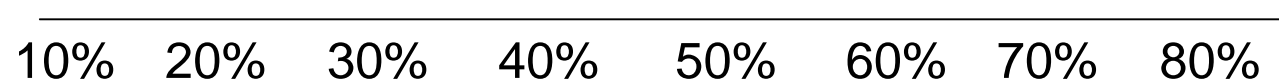
and in cases where the diagnosis is in doubt

3. Response to treatment directed towards heart failure

Left Ventricular Ejection Fraction

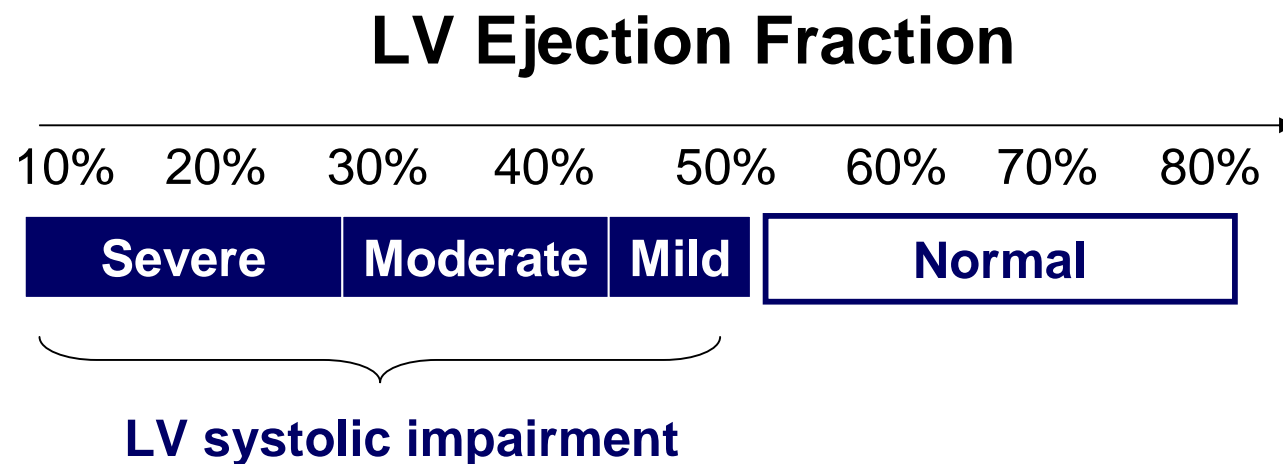
- Commonly measured on echocardiography
- Important for assessment of patient with HF

LV Ejection Fraction



Left Ventricular Ejection Fraction

- Commonly measured on echocardiography
- Important for assessment of patient with HF



Heart Failure and LVEF

- **Heart failure can occur with impaired or preserved left ventricular ejection fraction**

Clinical Presentation

Patient with Heart Failure

**Heart Failure with
Reduced LVEF**

**Heart Failure with
Preserved LVEF**

Clinical presentation = similar

+	Symptoms	+
+	Signs	+
↓	Exercise duration	↓

HF with Preserved LVEF

- **Clinical syndrome of HF**
- **LVEF >45% (or 50%)**
- **Echo: other confirmatory evidence**
 - **LVH or concentric remodeling**
 - **Left atrial enlargement**
 - **Echo Doppler criteria for LV diastolic dysfunction**

Heart failure Diagnosis

- **Patients frequently present with symptoms suggestive of heart failure**
 - **Dyspnoea, peripheral oedema**
- **Heart failure is difficult to diagnose**
- **“Over-diagnosis” is common**



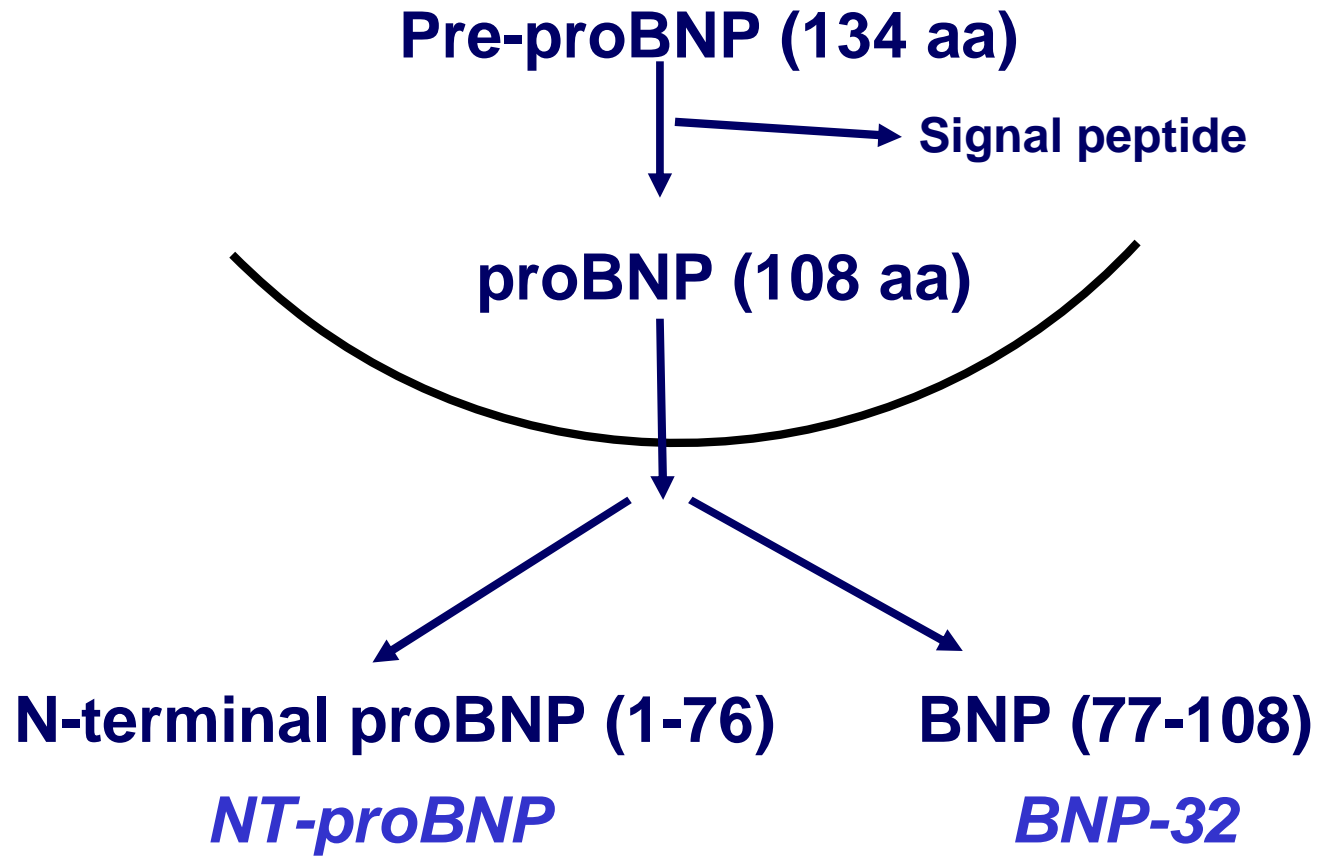
Difficulty with Diagnosis of HF

Diagnosis of HF in primary care difficult

- **Patients often elderly**
- **Symptoms may be mild**
- **Clinical symptoms are non-specific**
- **Clinical signs are often difficult and may be non-specific**
- **Co-morbidity common, complicates clinical assessment**
- **Access to other investigations in primary care may be limited**

Brain Natriuretic Peptide (BNP)

- **Natriuretic peptides**
- **Vasodilatory neurohormones**
- **Released from the heart (ventricles)**
- **Effects:**
 - **natriuresis & diuresis**
 - **suppresses RAA axis and sympathetic tone**
- **Elevated in conditions of increased wall stress in the heart**



Role of BNP

- **Screening**
- **Diagnosis of HF**
 - In patients with non-specific symptoms
- **Prognostic indicator**
 - Heart failure, acute coronary syndromes
- **Monitoring / guiding therapy in HF**
- **Valve disease assessment / prognosis**

Diagnostic Accuracy of Natriuretic Peptides in Heart Failure

JA Doust et al. Arch Intern Med 2004;164:1978

- **Systematic review, 20 studies assessing diagnostic accuracy of peptides in HF**
- **Pooled diagnostic odds ratio 30.9 against clinical criteria**
- **BNP is a useful first line test for the diagnosis of HF: “rule out test”**

Clinical Use of NT-proBNP

- **As first line test, after clinical assessment of patient presenting with symptoms suggestive of heart failure**
- **Incorporate in clinical decision making**
- **ECG / CXR may still be required**

Interpretation of NT-proBNP

NT-proBNP

- < 35pmol/L
 - Normal range NT-proBNP in young, healthy subjects

Single cut-off value for any patient presenting with suspected heart failure

high negative predictive value

“rules out” diagnosis of HF

Interpretation of NT-proBNP

NT-proBNP

- < 35pmol/L
 - Normal range NT-proBNP in young, healthy subjects
- >210 pmol/L
 - strongly suggests heart failure
- 36-209pmol/l

Intermediate result HF still possible, but NT-proBNP

- elevated by renal impairment, AF, LVH, COPD, after MI, in the very elderly,
- decreased by hypothyroidism, treatment with diuretics and ACE-inhibitors

Interpretation of NT-proBNP

Intermediate range NT-proBNP

- NT-proBNP 36-209pmol/l

Consider age cut-offs

< 50 years	NT-proBNP 35-49pmol/l HF unlikely
50-75 years	NT-proBNP <110pmol/l HF unlikely
>75yrs	NT-proBNP <210pmol/l HF unlikely

- **Heart failure remains a common problem in NZ**
- **Diagnosis of heart failure can be difficult, especially in primary care**
- **NT-proBNP**
 - **useful as “rule out” test in patients presenting with symptoms of suspected HF**
 - **does not replace need for further evaluation of patient with established diagnosis of heart failure**

Cases

Case 1

- **75 yr old man whom you have known for many years**
- **IHD, CORONARY DISEASE, treated for CHF, diabetes...**
- **Presents during winter months increasing dyspnoea over one week, cough, little sputum, no fever**
- **Mild dyspnoea, not sufficient for admission**
- **On exam:**
 - hyperinflated chest, basal creps,
 - very hard to see JVP (? elevated),
 - heart sounds faint, 1+ oedema

- **Usual treatment**
 - **Frusemide 40mg**
 - **Aspirin 150mg**
 - **Ventolin inhaler**
 - **Gliclazide 80mg bid**
 - **Accupril 10mg daily**
 - **Duride 30mg**

- **CXR**
 - hyperinflated lungs, no consolidation, comment “cannot rule out HF”
- **Bloods available:**
 - creatinine 0.15mmol/l
 - NT-BNP = 56 pmol/l

“Q”: What does this mean?

Interpretation of NT-proBNP

NT-proBNP value 56pmol/l in the “grey zone”

- **NT-proBNP 36-209pmol/l**

Consider age cut-offs

< 50 years

NT-proBNP 35-49pmol/l HF unlikely

50-75 years

NT-proBNP <110pmol/l HF unlikely

>75yrs

NT-proBNP <210pmol/l HF unlikely

50 year old man

- **Prior excess alcohol, asthma**
- **Atrial fibrillation for 5 years**
- **Maintained on aspirin, diltiazem for AF**

Presents with increased shortness of breath over 2-3months

- **Clinical examination a few wheezes in chest**
- **AF 90bpm (radial), BP 155/90**

- **Provisional diagnosis clinically of asthma**
- **Increase in inhaler usage with some improvement in symptoms**
- **Returns still not right**
 - **Initiated frusemide as diagnosis uncertain**
 - **NT-proBNP 430pmol/l**