

Utility of Repeated Inpatient NT-proBNP

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Background

N-terminal pro-B-type natriuretic peptide (NT-proBNP) is synthesised in ventricular myocardium and released in response to ventricular wall stress. Its utility as an acute inpatient investigation amongst patients with previously elevated results remains unclear. This study aimed to determine the likelihood of NT-proBNP reversion from positive to negative on subsequent admissions, and to characterise associated clinical features.

Study Design

Retrospective cohort study of inpatients with ≥ 2 NT-proBNP measurements, over a two-year period (August 2022 – August 2024) at Northern Pathology. Standardised thresholds for NTproBNP to suggest heart failure.

Positive/Rule In	Negative/Rule Out
Age < 50 yrs: > 450 ng/L	<300ng/L
50-75 yrs: > 900 ng/L	
Age > 75 yrs: > 1800 ng/L	

We excluded patients with only equivocal values ($n = 234$). And classified remaining patients ($n = 1778$) into groups. **Group 1** (positives, $n = 1262$), **Group 2** (negatives, $n = 409$), **Group 3** (positive to negative, $n = 50$), and **Group 4** (negative to positive, $n = 57$)

Results

There were a total of 5206 tests, averaging 2.9 tests per patient (or 3.3 per patient aged > 75).

Overall, only 3.8% of patients with an initial positive NT-BNP (Groups 1 and 3) ever returned to negative. Only 1% of those aged > 75 reverted to negative.

Table 2: Probability of conversion to negative by age

Age Group	Always Positive (n)	Converted to Negative (n)	Probability of Conversion (%)
<50 years	47	11	18.97%
50–75 years	388	30	7.18%
>75 years	827	9	1.08%

Younger patients were much more likely to transition to a negative value than older patients..

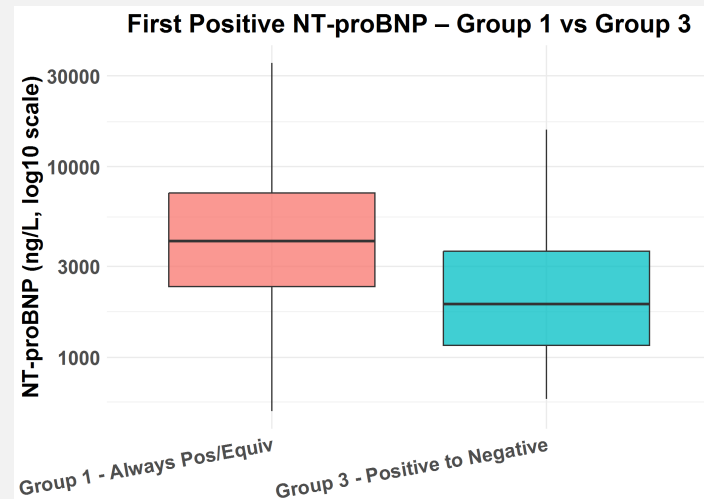


Figure 1: First Positive NT-proBNP was likely to be higher in those who stayed positive on subsequent test

A predictive model was generated using age, sex, and NT-proBNP values, with the Youden Index applied to identify the optimal discrimination threshold.

NTpro-BNP thresholds to predict staying positive	Age > 50	50 < Age < 75	Age > 75
	>1650ng/L OR = 1	>1900ng/L OR = 3.2	>4250ng/L OR = 27.8

Discussion

This study is the first, to our knowledge, to assess the utility of repeat NT-proBNP testing on inpatient admission following a prior positive result.

In patients aged >75 years, the likelihood of a subsequent negative NT-proBNP result was extremely low. Using the current Medicare rebate (AUD \$48.50 per test), 894 repeat tests were performed in 569 patients aged >75 years who had already exceeded a threshold of 4250 ng/L, costing **AU \$43,359**. Similarly, 1593 repeat tests were undertaken in patients aged >75 years above the standardised 1800 ng/L threshold—despite an estimated 1% probability of reversal—at a total cost of **AU \$77,260**. The study lacked power for detailed analysis of characteristics of groups 1 vs 3.

Conclusions

- ❖ Patients with a previous positive NT-proBNP rarely transition to negative, especially if aged >75 years.
- ❖ NT-proBNP can be used more judiciously in this group which will provide significant financial savings.