Cost-Minimisation and Budget-Impact Analysis of NT-proBNP Screening Test for Risk Assessment and Monitoring of Pulmonary Arterial Hypertension (PAH) Patients in the Australian Healthcare Setting
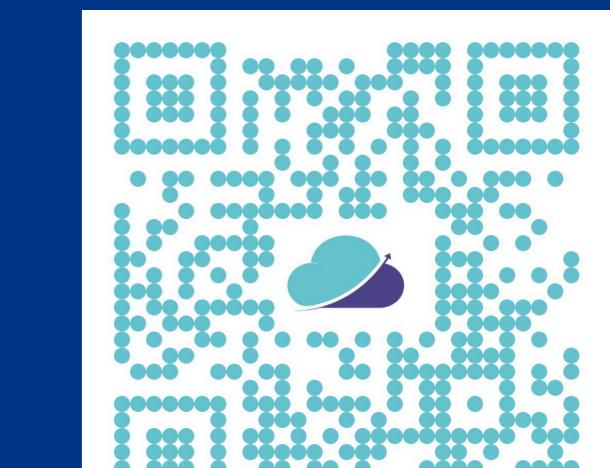
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INTRODUCTION

- N-terminal pro B-type natriuretic peptide (NT-proBNP) is a non-invasive biomarker used for risk stratification and to monitor disease progression in patients with pulmonary arterial hypertension (PAH)[1]
- Initial risk stratification in patients with established PAH is generally performed by transthoracic echocardiogram (TTE) and right heart catheterisation (RHC) at diagnosis[2]
- Evidence from the literature comparing the prognostic performance of NT-proBNP versus TTE revealed similar prognostic performance for both diagnostic procedures
- This study aimed to assess the financial implications of introducing NT-proBNP biomarker assay in patients with PAH

METHODS

- An Excel-based cost-minimisation analysis (CMA) and budget-impact analysis (BIA) were developed from an Australian healthcare system perspective
- The appropriate comparator in this population, in the absence of NT-proBNP, is TTE
- Additionally, a scenario analysis was included to assess the cost savings from incorporating the reference standard test, RHC, in the clinical management algorithm with and without NT-proBNP

Model Parameters

Model inputs were sourced from Australian public databases, and published literature, with costs adjusted to 2025 Australian dollars

1. Time horizon

- The CMA was conducted for a 1-year time horizon in the base case analysis, with NT-proBNP cost-offsets further evaluated over two years in a scenario analysis
- The BIA was conducted over a 6-year time horizon

2. Direct healthcare costs

- Direct health technology costs were derived from the March 2025 Medicare Benefits Schedule (MBS) item fees[3]
- For the cost of RHC, the CMA included the cost of insertion of right heart balloon catheter and associated anaesthesia (**Table 1**)

Table 1. Direct health technology costs

Parameter	Value (100% fee)	Source
Direct health technology costs (base case comparator)		
Unit cost of NT-proBNP test	$58.50	MBS item code 66830
Unit cost of TTE Test	$258.70	MBS item code 55126 / 55129
Additional costs (alternate comparator in sensitivity analysis)		
Unit cost of RHC Test	$507.45	MBS item code 38200/38524

Abbreviations: MBS, Medicare Benefits Schedule; NT-proBNP, N-terminal proB-type natriuretic peptide; TTE, transthoracic echocardiogram; RHC, right heart catheterization.

3. Frequency of tests and substitution rate

- Frequency of NT-proBNP/TTE/RHC testing was based on the European Society of Cardiology/European Respiratory Society (ESC/ERS) 2022 guidelines (**Table 2**)[1]
- Rate of substitution of TTE/RHC tests by NT-proBNP testing was based on analysis of PHSANZ registry data
- Since the follow-up interval can range from 3 to 6 months, our analysis used 3 months as the base case follow-up interval, leading to a total of 4 assessments per patient per year
- However, an additional scenario with a 5-6 month follow-up interval was evaluated, which assumes 3 assessments per patient per year

Table 2. Assessment and timing for the follow-up of patients with PAH

	At baseline	3–6 months after changes in therapy	Every 3–6 months in stable patients	In case of clinical worsening
Blood test (including NT-proBNP)				
RHC				

Abbreviations: NT-proBNP, N-terminal proB-type natriuretic peptide; PAH, pulmonary arterial hypertension; RHC, right heart catheterization.
Note: Green: is indicated; yellow: should be considered; orange: may be considered. Source: 2022 ESC/ERS Guidelines.

RESULTS

1. Cost-Minimisation Analysis (CMA)

The total cost per patient for clinical algorithms with and without NT-proBNP was $880.75 and $1,034.80, respectively (**Table 3**), demonstrating that incorporating NT-proBNP for routine PAH assessment yields an annual saving of $154.05 per patient

2. Budget-Impact Analysis (BIA)

- The budget impact model estimated 2,450 diagnosed PAH patients in Year 1 increasing to 3,619 by Year 6
- Assuming a 90% uptake rate of NT-proBNP testing, the net financial savings to Medicare Benefits Schedule (MBS) were $288,549 in Year 1, increasing to $426,190 in Year 6 (85% MBS rebate applied) (**Table 4**)
- The routine NT-proBNP testing for PAH risk assessment and monitoring is estimated to yield approximately $2.3M in cost savings over a six-year period

Table 3. Total cost per patient associated with and without NT-proBNP clinical management algorithms in patients diagnosed with PAH

Parameter	Clinical management algorithm (without NT-proBNP)	Clinical management algorithm (with NT-proBNP)	Source/Notes
Total no. of tests per year	4	4	
Unit cost of NT-proBNP test	$58.50	$58.50	MBS 66830
Proportion of patients undergoing NT-proBNP test at each visit (baseline, and 3 follow-up visits)	0%	100%	2022 ESC/ERS Guidelines
Total NT-proBNP test cost/patient/year	$0.00	$234.00	
Unit cost of TTE test	$258.70	$258.70	MBS 55126/55129
Proportion of patients undergoing TTE test at baseline	100%	100%	
Proportion of patients undergoing TTE test at follow-up visit 1	100%	100%	
Proportion of patients undergoing TTE test at follow-up visit 2	100%	25%	2022 ESC/ERS Guidelines PHSANZ registry analysis
Proportion of patients undergoing TTE test at follow-up visit 3	100%	25%	
Total TTE test cost/patient/year	**$1,034.80**	**$646.75**	
Total cost per patient per year	**$1,034.80**	**$880.75**	
Net cost difference per patient (without NT-proBNP - with NT-proBNP)		**$154.05**	

Abbreviations: ESC, European society of cardiology; ERS, European respiratory society; TTE, transthoracic echocardiogram; RHC, right heart catheterisation; MBS, Medicare Benefits Schedule; NT-proBNP, N-terminal proB-type natriuretic peptide; PAH, pulmonary arterial hypertension; PHSANZ , Pulmonary hypertension society of Australia and New Zealand; TTE, transthoracic echocardiogram.

Table 4. Net financial implications of NT-proBNP testing to the MBS

Parameter	Year 1 2025	Year 2 2026	Year 3 2027	Year 4 2028	Year 5 2029	Year 6 2030
Financial impact of NT-proBNP						
Prevalence of PAH	2,450	2,967	3,478	3,527	3,574	3,619
Uptake rate	90%	90%	90%	90%	90%	90%
PAH patients electing NT-proBNP test	2,205	2,671	3,130	3,174	3,216	3,257
NT-proBNP test/patient/year#	4	4	4	4	4	4
Total NT-proBNP tests/year	8,821	10,683	12,519	12,696	12,865	13,028
NT-proBNP test unit cost (applying 85% rebate)	$49.75	$49.75	$49.75	$49.75	$49.75	$49.75
Cost to MBS (NT-proBNP)	**$438,833**	**$531,461**	**$622,821**	**$631,608**	**$640,056**	**$648,160**
Financial impact of affected service (TTE)						
TTE tests replaced by NT-proBNP/patient/year#	1.50	1.50	1.50	1.50	1.50	1.50
Total TTE tests affected	3,308	4,006	4,695	4,761	4,825	4,886
TTE test unit cost	$219.90	$219.90	$219.90	$219.90	$219.90	$219.90
Cost to MBS (TTE)	**$727,382**	**$880,916**	**$1,032,349**	**$1,046,915**	**$1,060,916**	**$1,074,350**
Net financial savings to MBS*	**-$288,549**	**-$349,455**	**-$409,528**	**-$415,306**	**-$420,861**	**-$426,190**

Abbreviations: MBS, Medicare Benefits Schedule; NT-proBNP, N-terminal pro-brain natriuretic peptide; PAH, pulmonary arterial hypertension; TTE, transthoracic echocardiogram.
Note: *The 2025 Medicare Benefits Schedule fees of $58.50 for NT-proBNP and $258.70 for TTE was considered after applying 85% rebate # Indicates the number of tests were assumed as most conservative scenario i.e follow-up every 3 months

Scenario analyses

The impact of alternate model settings and assumptions was evaluated in scenario analyses. A series of univariate analyses, varying the time horizon (2 years), the comparator (including RHC), the follow-up period (5 to 6 months) and rate of clinical worsening of patients (35% or 50%), MBS funding of NT-proBNP was cost-saving in all scenarios except scenario 2 (**Table 5 and Figure 1**)

Table 5. Assumptions of scenario and sensitivity analysis

	Time horizon	Comparator	NT-proBNP follow-up period
Base Case	1 year	Transthoracic echocardiogram	3 months
Scenario 1	2 year		
Scenario 2	1 year		5-6 months
Scenario 3	2 year		
Scenario 4	1 year	Transthoracic echocardiogram/ right heart catheterization	3 months
Scenario 5	2 year		
Scenario 6	1 year		5-6 months
Scenario 7	2 year		

Figure 1. Net Cost Difference per Patient by Scenario and Clinical Worsening Rate

Net Cost Difference per Patient by Scenario and Clinical Worsening Rate

- Rate of clinical worsening: 25% (Base case)
- Rate of clinical worsening: 35% (Sensitivity 1)
- Rate of clinical worsening: 50% (Sensitivity 2)
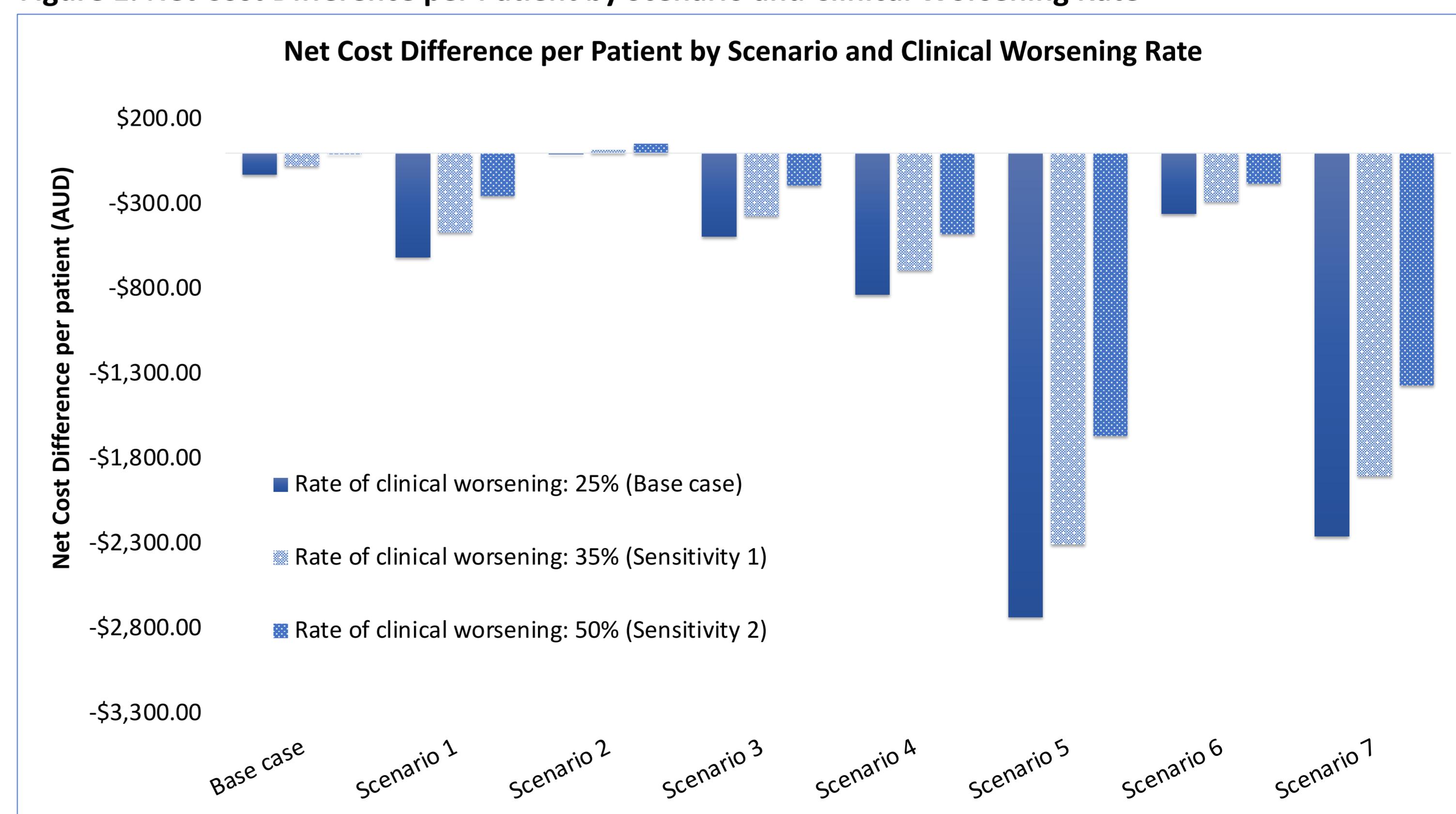
CONCLUSIONS

Monitoring of PAH patients with NT-proBNP funded on the MBS is a cost- saving option. The routine use of NT-proBNP test for risk assessment and monitoring in PAH could result in considerable costs savings of approximately $2.3M over six years

REFERENCES: 1. Humbert et al, ESC/ERS guidelines, European heart journal. 2022 Oct 7;43(38):3618-731; 2. Galie N et al, Eur Heart J 2016;37(1):67-119. DOI: 10.1093/eurheartj/ehv317; 3. The March 2025 Medicare Benefits Schedule. Available at: https://www.mbsonline.gov.au/internet/mbsonline/publishing.nsf/Content/Downloads-250301; Accessed 27 June 2025.

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