

Cost-Minimisation and Budget Impact Analysis of NT-proBNP Screening for Systemic Sclerosis-Related Pulmonary Arterial Hypertension in the Australian Healthcare Setting



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Papadopoulos G¹, Barman P², Gupta A², Rath H²

¹Lucid Health Consulting, Sydney, Australia; ²Skyward Analytics Pvt. Ltd., Gurugram, Haryana, India

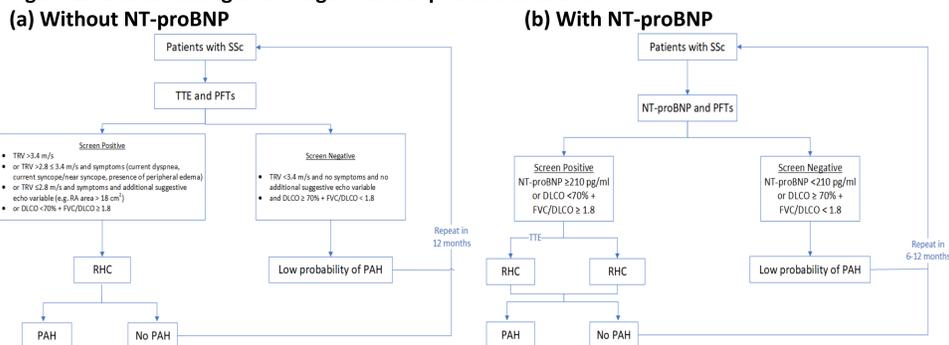
INTRODUCTION

- N-terminal pro B-type natriuretic peptide (NT-proBNP) biomarker assay can be used as part of a screening algorithm for pulmonary arterial hypertension (PAH) in patients with established systemic sclerosis (SSc), to identify those requiring right heart catheterisation (RHC)¹
- Systemic sclerosis-related pulmonary arterial hypertension (SSc-PAH) is often clinically silent in its early stages and difficult to distinguish from nonspecific symptoms such as fatigue and dyspnea. However, as it accounts for approximately 30% of SSc-related deaths, early detection remains both critical and challenging²
- The aim of this study is to assess the financial implication of the introduction of NT-proBNP screening for SSc-PAH

METHODS

- An Excel-based cost-minimisation analysis (CMA) and budget impact analysis (BIA) were developed from an Australian healthcare system perspective
- A cost-minimisation approach was used in the analysis because NT-proBNP testing demonstrated an effectiveness and safety profile comparable to transthoracic echocardiogram (TTE) and is intended to replace TTE at the initial screening phase.
- A BIA using an epidemiological approach was conducted over a 6-year time horizon to estimate the number of SSc patients undergoing PAH screening

Figure 1. Clinical management algorithms in patients with SSc



Abbreviations: DLCO, diffusing capacity of lung for carbon monoxide; FVC, forced vital capacity; m/s, metre per second; PAH, pulmonary arterial hypertension; PFT, pulmonary function testing; RA, right atrium area; SSc, systemic sclerosis; TTE, transthoracic echocardiography; TRV, tricuspid regurgitant velocity.

Health care resource use and costs

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

1. Direct healthcare cost

- Direct health technology costs were derived from the March 2025 Medicare Benefits Schedule (MBS) item fees³

2. Frequency & proportion of tests

- Frequency of NT-proBNP/TTE testing is based on Australian Scleroderma Interest Group (ASIG) algorithm (Figure 1):

“Initial testing with NT-proBNP (instead of TTE) and pulmonary function tests (PFTs) as the first-line screening strategy in patients with SSc at risk for PAH was preferred.” - ASIG

- In patients with SSc, an annual evaluation of PAH risk is recommended, with about 10% requiring a second test due to symptom worsening or borderline results
- As per the ASIG algorithm, this CMA assumed that every patient who screens positive post-NT-proBNP test would undergo an additional TTE test as well
- 10% of patients with systemic sclerosis have SSc-PAH according to Australian Rheumatology Association⁴

3. Additional costs and/or cost offsets

- All other costs are identical for both the clinical management algorithms (with and without NT-proBNP) and have therefore, not been included in this analysis
- There are no differences in the costs of monitoring or managing adverse events associated with the algorithms

Time horizon

CMA: 1-year in the base case analysis; BIA: 6-year time horizon

RESULTS

1. Cost-minimisation analysis (CMA)

- This CMA estimated the annual screening cost per patient for screening algorithm with and without NT-proBNP
- Based on local clinician advice, it was assumed that 10% of patients would receive two NT-proBNP or TTE screening tests per year, while the remaining 90% would undergo one test annually
- The total cost per patient associated with clinical algorithms with and without NT-proBNP was \$90.22 and \$284.57, respectively (Table 2)
- Incorporating NT-proBNP testing into the assessment of SSc-PAH patients would be a cost-saving option, with an annual saving of \$194.35 per patient

FUNDING This study did not receive any funding, and the authors declare no conflicts of interest

Table 2. Cost associated with clinical management algorithms with and without NT-proBNP testing in patients with SSc-PAH

Parameter	Without NT-proBNP	With NT-proBNP	Source/Notes
% patients undergoing two screening tests per year	10%	10%	Local clinician advice
% patients undergoing one screening test per year	90%	90%	Number of tests/patient/year is assumed to be one. Additionally, 10% of patients undergo second test on worsening of symptoms or whose results are at borderline
NT-proBNP Test Fee	\$58.50	\$58.50	MBS 66830
TTE Test Fee	\$258.70	\$258.70	MBS 55133
Proportion of patients tested positive for SSc-PAH	10%	10%	Australian Rheumatology Association
TTE test/year for patient tested positive in screening test	0.0	1.0	Patients tested positive with NT-proBNP undergo a TTE test
Total NT-proBNP test cost/patient/year	\$0.00	\$64.35	
Total TTE test cost/patient/year	\$284.57*	\$25.87	
Total cost per patient	\$284.57	\$90.22	
Net cost difference per patient		\$194.35	

Note: * Indicates the total cost (\$258.70 * 1.1) by assuming 1.1 test/patient/year

Abbreviations: TTE, transthoracic echocardiogram; NT-proBNP, N-terminal proB-type natriuretic peptide; SSc-PAH, systemic sclerosis related pulmonary arterial hypertension

2. Budget impact analysis (BIA)

- Based on an estimated prevalence of 20 cases per 100,000 population⁵, the projected number of patients with SSc in Australia was 5,594 in Year 1, increasing to 5,859 in Year 6
- The base case assumed 90% uptake rate of NT-proBNP test and 1.1 tests per patient/year. Consequently, the estimated number of tests was 5,538 in Year 1, increasing to 5,800 in Year 6
- The estimated net financial saving to Medicare Benefits Schedule (MBS) was \$720,890 in Year 1, increasing to \$755,028 in Year 6 (85% rebate applied) (Table 3)

Table 3. Net financial implications of NT-proBNP testing to the MBS

	Year 1 2025	Year 2 2026	Year 3 2027	Year 4 2028	Year 5 2029	Year 6 2030
Financial impact of NT-proBNP						
Prevalent number of SSc patients	5,594	5,561	5,640	5,716	5,789	5,859
Uptake rate	90%	90%	90%	90%	90%	90%
Total SSc patients electing NT-proBNP test	5,035	5,005	5,076	5,145	5,210	5,273
NT-proBNP test/patient/year	1.1	1.1	1.1	1.1	1.1	1.1
Total NT-proBNP tests/year	5,538	5,506	5,584	5,659	5,731	5,800
NT-proBNP Test Fee (applying 85% MBS rebate)	\$49.75	\$49.75	\$49.75	\$49.75	\$49.75	\$49.75
NT-proBNP cost to MBS	\$275,523	\$273,900	\$277,795	\$281,540	\$285,136	\$288,570
Proportion of SSc-PAH positive patients undergoing TTE	503	501	508	514	521	527
Additional cost increased to MBS for TTE	\$110,713	\$110,060	\$111,626	\$113,130	\$114,575	\$115,955
Net total cost to MBS	\$386,235	\$383,960	\$389,420	\$394,670	\$399,711	\$404,525
Financial impact of affected service (TTE)						
Total TTE tests affected by NT-proBNP introduction (100%)	5,035	5,005	5,076	5,145	5,210	5,273
TTE Test Fee (applying 85% MBS rebate)	\$219.90	\$219.90	\$219.90	\$219.90	\$219.90	\$219.90
Total TTE cost to MBS	\$1,107,126	\$1,100,605	\$1,116,256	\$1,131,304	\$1,145,753	\$1,159,554
Net financial impact to MBS*	-\$720,890	-\$716,644	-\$726,835	-\$736,634	-\$746,042	-\$755,028

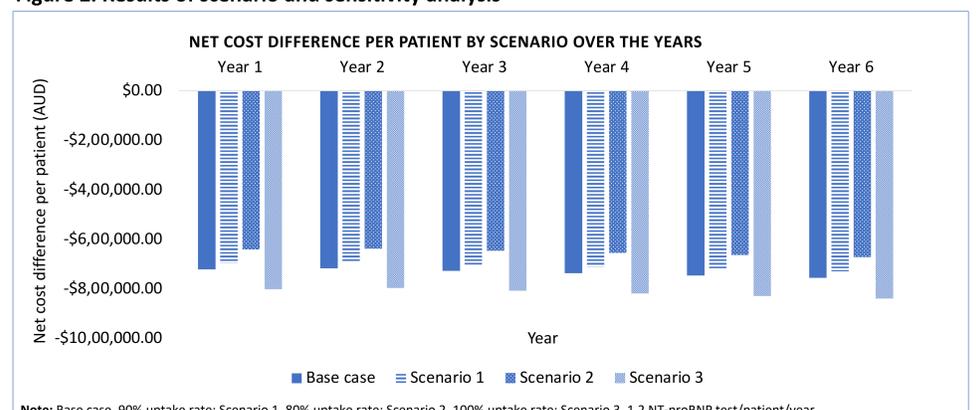
Note: *The 2025 Medicare Benefits Schedule fees of \$58.50 for NT-proBNP and \$258.70 for TTE was considered on which 85% rebate was applied

Abbreviations: TTE, transthoracic echocardiogram; NT-proBNP, N-terminal proB-type natriuretic peptide; PAH, pulmonary arterial hypertension; MBS, Medicare benefits schedule; SSc, systemic sclerosis

Scenario and Sensitivity analysis

- A series of univariate analyses, varying the uptake rate (90% in base case, 80% in Scenario 1, 100% in Scenario 2) and increasing the number of NT-proBNP tests per patient to 1.2 in Scenario 3, demonstrated that MBS funding for NT-proBNP led to overall cost savings (Figure 2)

Figure 2. Results of scenario and sensitivity analysis



Note: Base case, 90% uptake rate; Scenario 1, 80% uptake rate; Scenario 2, 100% uptake rate; Scenario 3, 1.2 NT-proBNP test/patient/year.

CONCLUSION

Introducing NT-proBNP screening for the SSc patients at risk of PAH would be a cost-saving option. Over six years, NT-proBNP screening for SSc-PAH may lead to a saving of approximately \$4.4 million to the Australian public health system

Poster presented at ISPOR EUROPE 2025, Glasgow, Scotland (09-12 Nov, 2025)