

Budget Impact And Cost Minimisation Analysis Of Subcutaneous Combination Of Trastuzumab and Pertuzumab For The Treatment of HER2+ Breast Cancer In The Chilean Public Health System

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Objective

In Chile, public reimbursement of anti-HER2 agents includes subcutaneous (SC) trastuzumab (T) for all indications¹, intravenous (IV) pertuzumab (P) for first-line metastatic breast cancer (BC), and trastuzumab emtansine (TDM1) in adjuvant setting with residual disease after neoadjuvant treatment². A new SC combination of trastuzumab and pertuzumab (T+P SC) has been available since 2022³. This study aimed to determine the potential savings of incorporating the T+P SC combination into the Chilean public health system for treating women with HER2+ BC under different coverage scenarios.

Methods

Modeling: A stock-and-flow model for public HER2+ patients was developed for 2020-2029. Three scenarios were modeled, where TDM1 reimbursement status remained constant.

1 Actual reimbursement scenario: T is covered for treating neoadjuvant, adjuvant, and metastatic HER2+ BC. P is covered for metastatic BC.

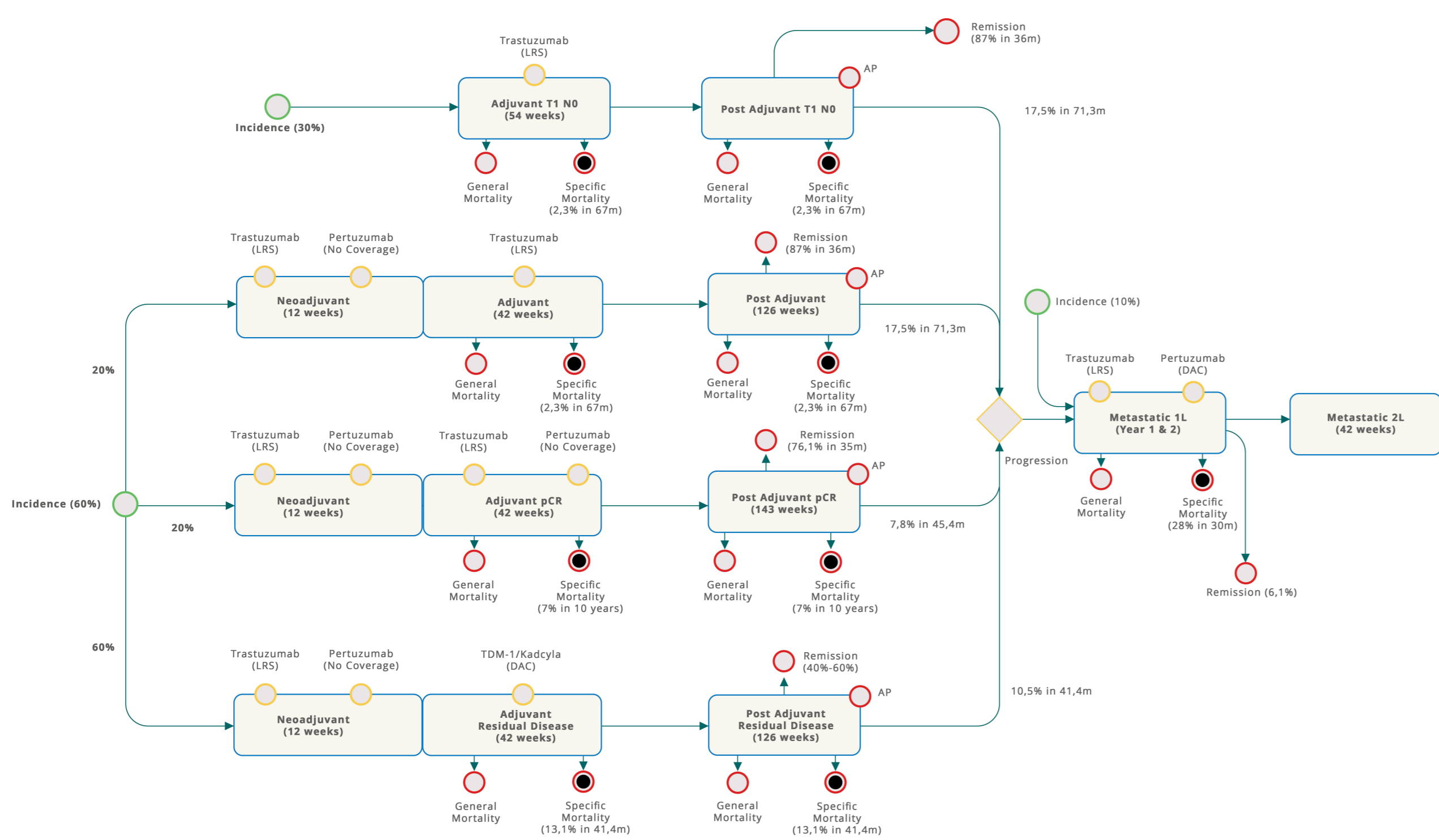


Figure 1. Actual reimbursement scenario. pCR: Complete Pathological Response. RD: Residual Disease. 1L: First line. 2L: Second line. At each of the treatment stages, patients could exit the model either by overall mortality, specific mortality or remission.

2 T+P SC combination is covered in first-line metastatic stage only, while T is covered in neoadjuvant and adjuvant stages.

3 T+P SC combination is covered in first-line metastatic and neoadjuvant stages, while T is in adjuvant.

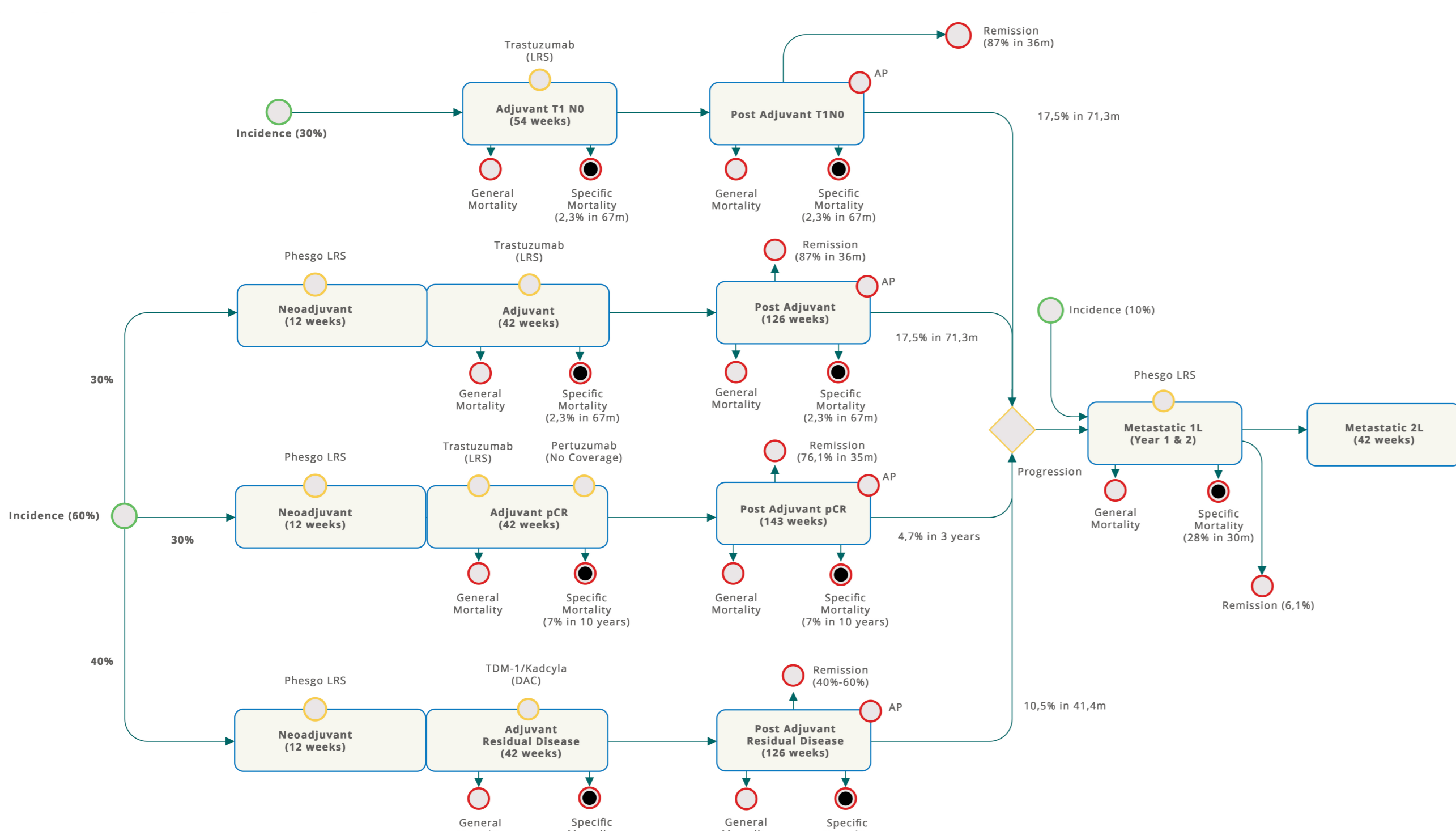


Figure 2. Third scenario. T+P SC in 1 L metastasis and neoadjuvant. pCR: Complete Pathological Response. RD: Residual Disease. 1L: First line. 2L: Second line. At each of the treatment stages, patients could exit the model either by overall mortality, specific mortality or remission.

Clinical inputs:

Parameter	Value (reference)	Parameter	Value (reference)
Neoadjuvant incidence	60% ⁴	H Adjuvant percentage after neoadjuvant treatment	20% ¹⁰
Metastatic incidence	10% ⁴	Adjuvant-specific mortality T1N0	2,3% in 67 months ¹¹
T1N0 adjuvant incidence	30% ⁴	Adjuvant T1N0 remission	87% in 36 months ⁴
Incidence for the TDM1 treatment arm without H+P in neoadjuvant and with H+P	60% ⁵ , 40%	Progression to metastasis in post-adjuvant arm	17,5% in 71,3 months ⁴
TDM1 branch-specific mortality	13,1% in 41,4 months ⁶	Post-adjuvant specific mortality	2,3% in 67 months ¹¹
Progression to metastasis TDM1 branch	10,5% in 41,4 months ⁶	Post-adjuvant remission	87% in 36 months ¹²
TDM1 branch remission	40-60% per year ⁶	1L Metastasis-specific mortality	28% in 30 months ¹⁴
pCR percentage after neoadjuvant treatment	20% ⁴	1L Metastasis-specific remission	6,1% ¹⁵
pCR after neoadjuvant branch-specific mortality	7% in 10 years ⁷	Post-adjuvant remission in pCR T+P SC neoadjuvant branch	95% in 36 months ⁹
Post-adjuvant remission in pCR neoadjuvant branch	76,1% in 35 months ⁸	Metastasis progression in T+P SC scenario post adjuvant pCR	4,7% in 36 months ⁹
Progression to metastasis pCR neoadjuvant arm	7,8% in 45,5 months ⁹		

Table 1. Clinical parameters used for scenario modeling. pCR: Complete Pathological Response.

A sensitivity analysis was performed on the entry assumption for the three neoadjuvant arms.

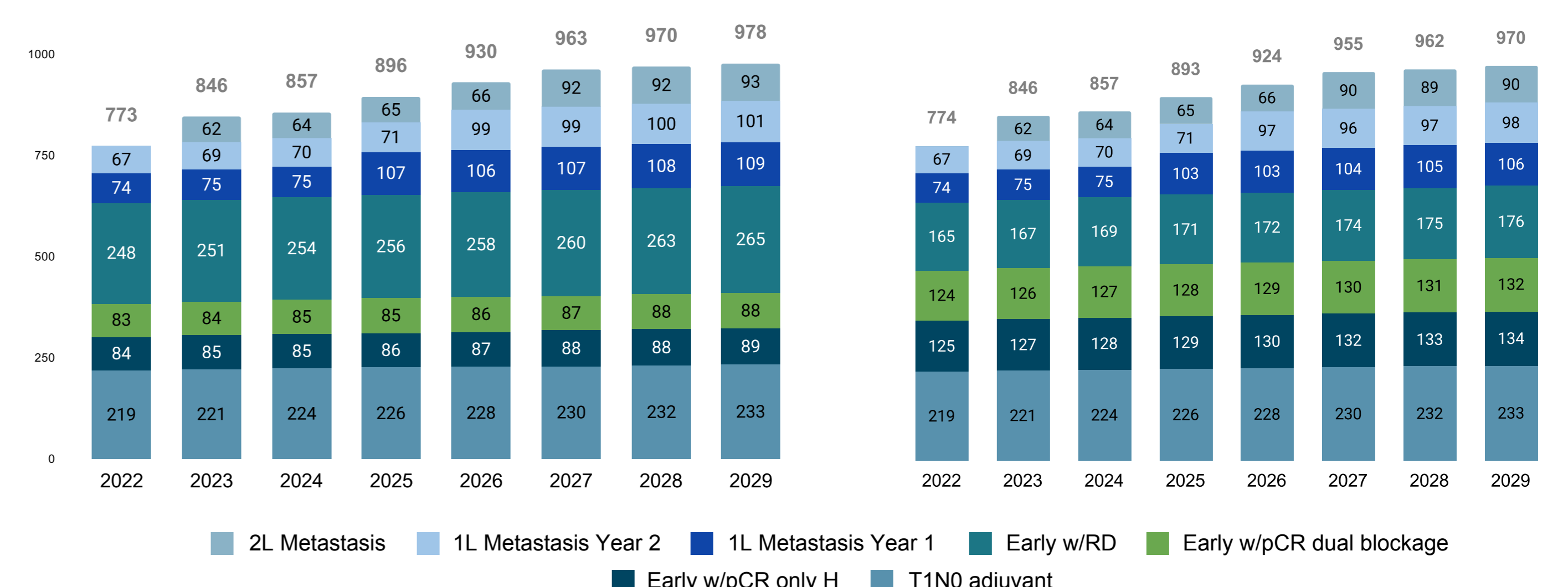
Costing inputs: Costs were reported in USD, with USD 1,00 equivalent to CLP 849,39 based on the average exchange rate as of May, 2022. Price of T (USD 953,63), P (USD 1.751,78), and TDM1 (USD 12,26 per mg) were obtained from Mercado Publico 2022¹⁶. T+P SC cost was provided by Roche (USD 2.593,87). SC and IV administration costs were estimated from Rojas *et al*, 2020¹⁷. The number of cycles were obtained from the study conducted by the Institute for Clinical and Health Effectiveness in 2020¹⁸. Indirect costs were not considered in this analysis. Net present value (NPV) was calculated over eight years for the three scenarios.

Results

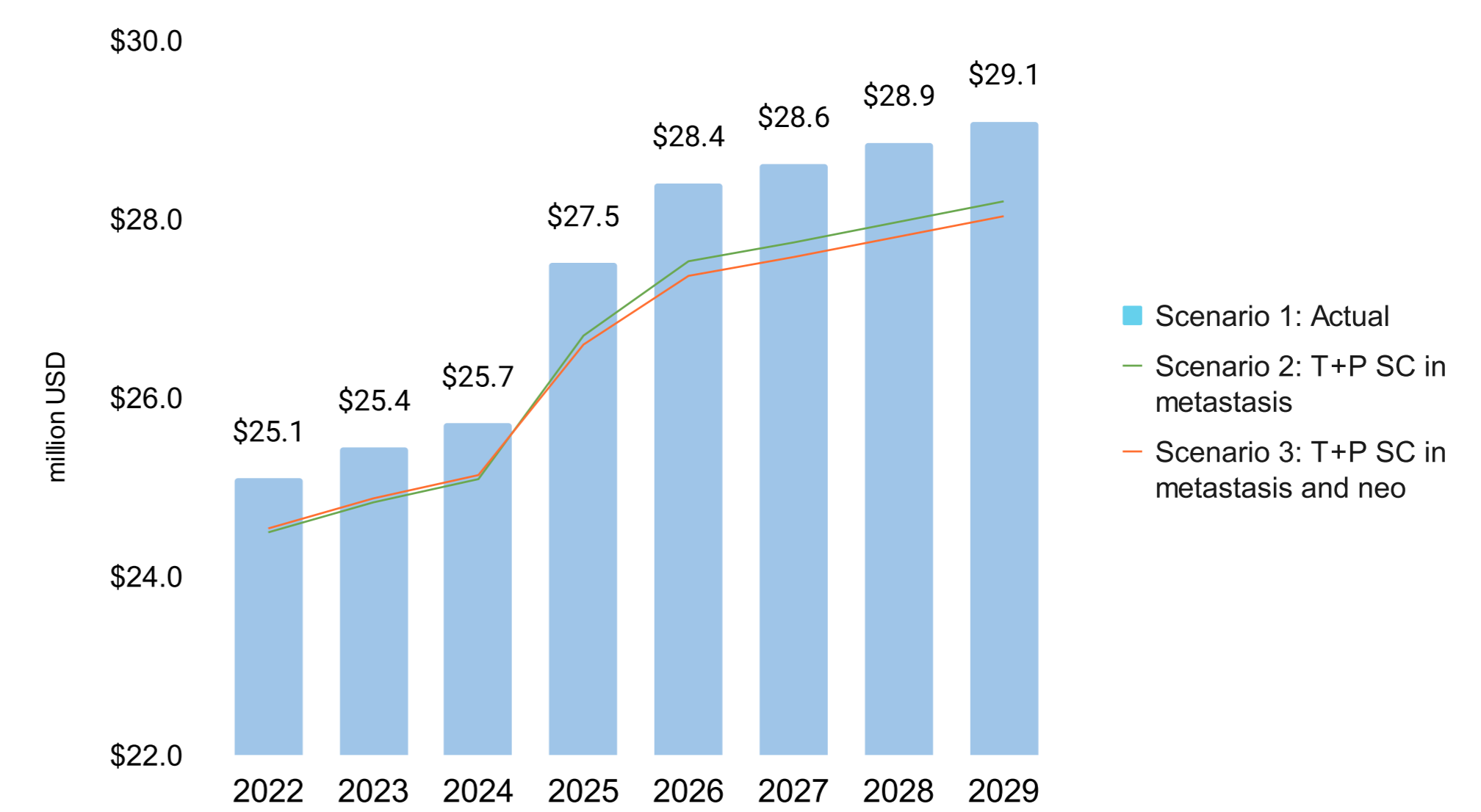
Approximately 773 patients with HER2+ BC were estimated in 2022 for all scenarios, but their distribution by stage was different. When T+P was not covered at the early stage (scenarios 1 and 2), there were approximately 33% more patients with residual disease after a neoadjuvant stage compared with scenario 3, with T+P SC covered in the neoadjuvant stage. All three scenarios show increased patients over time, reaching 978 patients in scenarios 1 and 2 and 970 in scenario 3.

Graph 1. Number of HER2+ patient under actual scenario (1)

Graph 2. Number of HER2+ patient under scenario 3



Total expenditure in 2022 for the current scenario was USD 25.092.356; by 2029, it is estimated to reach USD 29.087.822. For scenario 2 and 3, total expenditure in 2022 was USD 24.492.274 and USD 24.535.955; by 2029, expenditure is estimated to reach USD 28.196.954 and USD 28.030.218, respectively (Graph 3).



Graph 3. Total expenditure (million USD) in 2022-29 under the three coverage scenarios.

Savings versus scenario 1	2022	2023	2024	2025	2026	2027	2028	2029	NPV
Scenario 2	600.081,2	611.474,7	618.126,2	808.169,9	869.753,0	875.507,2	883.349,2	890.868,8	5.347.682,0
Scenario 3	556.400,2	566.953,7	573.115,8	907.397,3	1.033.408,6	1.038.581,3	1.048.419,9	1.057.604,3	5.853.862,3

Table 2. Annual savings and NPV in USD from 2022 to 2029 when comparing scenario 1 versus scenarios 2 (T+P SC in first-line metastasis-only) and 3 (T+P SC in first-line metastasis and neoadjuvant).

The variation of parameters in the sensitivity analysis does not have a significant impact on the final results of the model, due to the number of patients entering the model each year.

Conclusions

Including T+P SC in both scenarios (metastasis only and metastasis and neoadjuvant) generates savings for the Chilean public health system. The most cost-saving scenario is when T+P SC is covered in first-line metastasis and neoadjuvant. These savings come from improved clinical response due to neoadjuvant dual HER2-blockade, resulting in fewer patients being treated at a metastatic stage, a cost-saving option over P in metastasis, and lower SC administration costs over IV treatment.

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