

Background

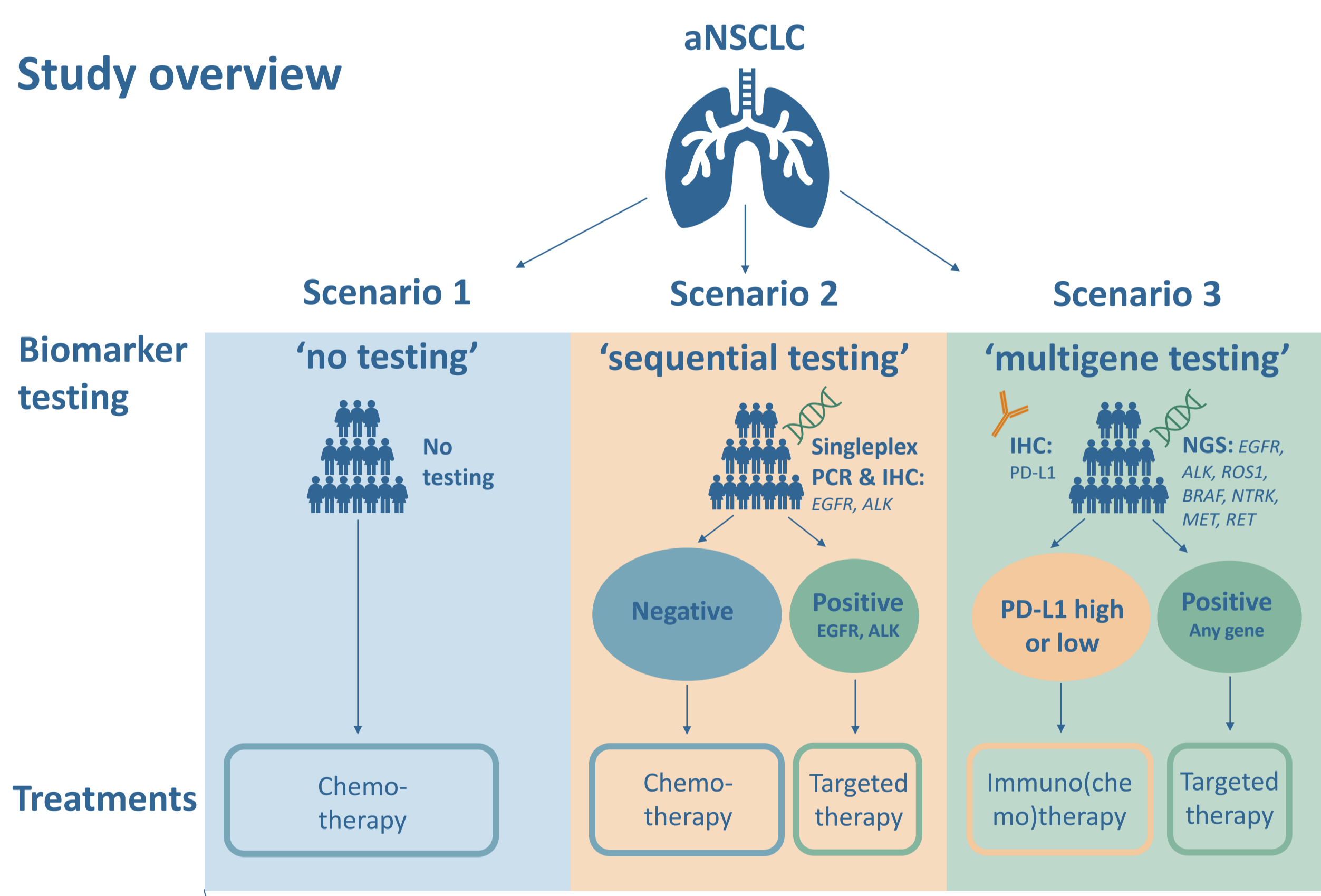
- Precision medicine (PM) necessitates biomarker testing to identify molecular targets which enables patient stratification and biomarker-driven therapeutic regimens (1).
- PM is considered to increase the efficiency of care delivery, improve health outcomes and may also reduce treatment-related toxicities (2).
- There is limited evidence regarding the costs-effectiveness of PM in oncology. PM may have contrary effects on costs of different categories (3,4):
 - Increased costs can result from e.g. extensive biomarker testing of whole patient populations and increased use of on-patent medicines.
 - Reduced costs can result from e.g. fewer failed treatment attempts and reduced hospital admissions for treatment-related adverse events.
 - Reduced costs from a treasury perspective can also result from less public payments for sick leave and early retirement.

Aim of study

To assess the value of biomarker testing from a holistic perspective based on the example of advanced non-small cell lung cancer (aNSCLC).

Methods

Study overview



- Outcomes**
- Survival** (mean life years and absolute survival rate)
 - Quality of life** (number of treatment-related adverse events)
 - Health care costs** (tests, medicines, administration of medicines, treatment of adverse events, other medical resource use, end-of-life care)
 - Non-health care costs** (public payments for sick leave and disability pension)

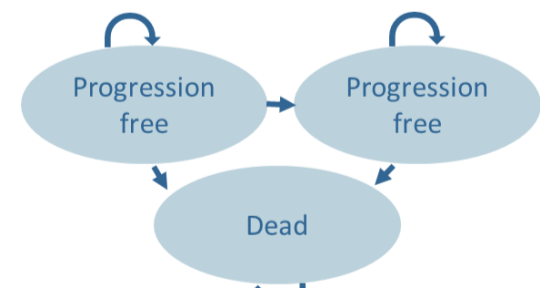
Analysis



Analyses for 9 countries across all continents



1- and 5-year horizons evaluated



Partitioned survival model

Inputs

- Prevalence of mutations and gene expressions in NSCLC** (country-specific)
- Accuracy of biomarker tests** (sensitivity and specificity)
- >25 first-line therapies** (US FDA approval until Dec 31, 2021)
- Unit costs** (country-specific, including medicine costs based on list prices from Eversana)

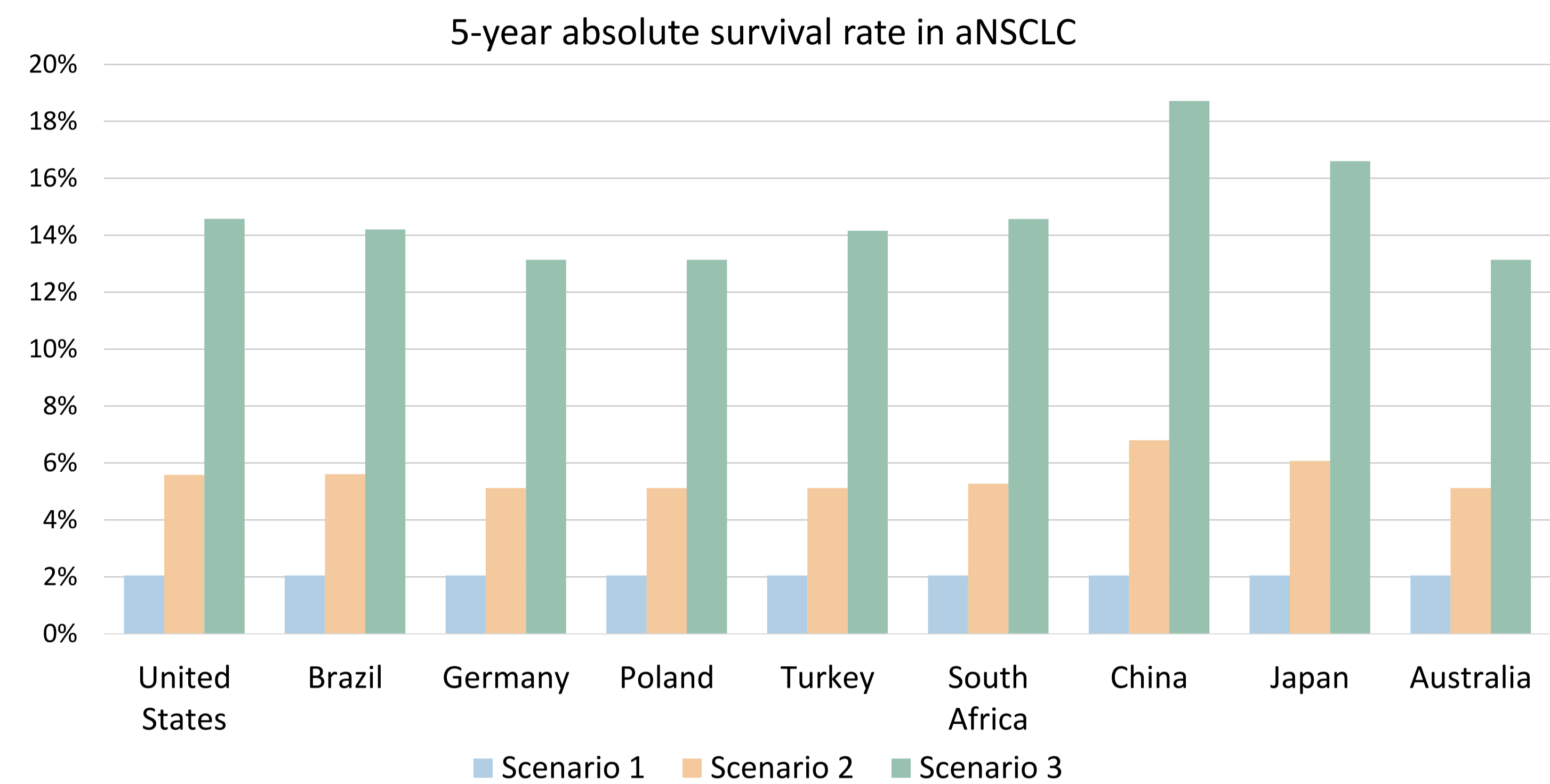
Abbreviations: IHC = immunohistochemistry, NGS = next-generation sequencing

References

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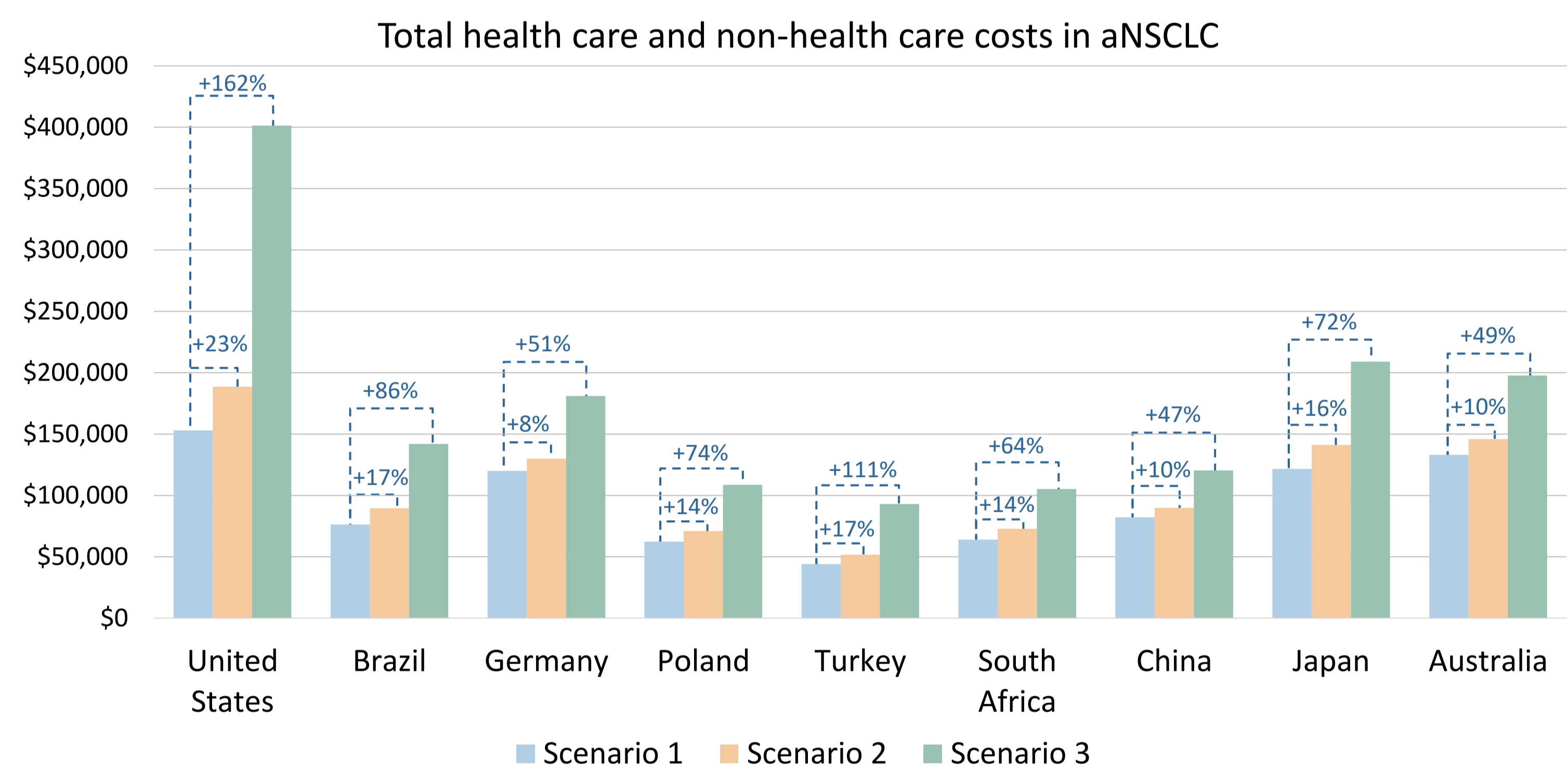
Results

Survival and Quality of Life – 5-year horizon



- Compared to no testing (scenario 1), patient survival improved with sequential testing (2.5 to 3-fold; scenario 2) and with multigene testing (6 to 9-fold; scenario 3) in all 9 countries.
- China and Japan observed the greatest survival improvements, due to the higher local prevalence of targetable mutations (in particular EGFR).
- The number of treatment-related adverse events decreased with scenario 2 (6–16%) and 3 (20–31%) compared to scenario 1, indicating improved quality of life.

Costs – 5-year horizon, per patient



- For all countries, total costs increased for both scenario 2 and scenario 3 compared to scenario 1.
- For individual cost components, changes compared to scenario 1 were in both directions:

Type of cost	S. 2	S. 3	Type of cost	S. 2	S. 3
Tests	↑	↑	Other medical resource use	↑	↑
Medicines	↑	↑	End-of-life care	↓	↓
Administration of medicines	↓	↔	Sick leave payments	↑	↑
Treatment of adverse events	↓	↓	Disability pension payments	↑	↑

Conclusion

- The results indicate that the gradual introduction of biomarker testing and PM in aNSCLC can improve health outcomes for patients globally.
- These health gains can only be realized by investing in biomarker testing and medicines. While costs for testing and medicines would increase, cost decreases for other medical services and non-health care costs may partly offset the cost increases.
- The overall results demonstrate the importance to apply a wider perspective in the assessment of the value of PM in oncology.