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Immune signatures in NSCLC-associated pleural effusions and implications for prognosis

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**IASLC 2026 World
Conference on Lung Cancer**
SEPTEMBER 12 – 15, 2026
SEOUL, REPUBLIC OF KOREA

INTRODUCTION

Background:

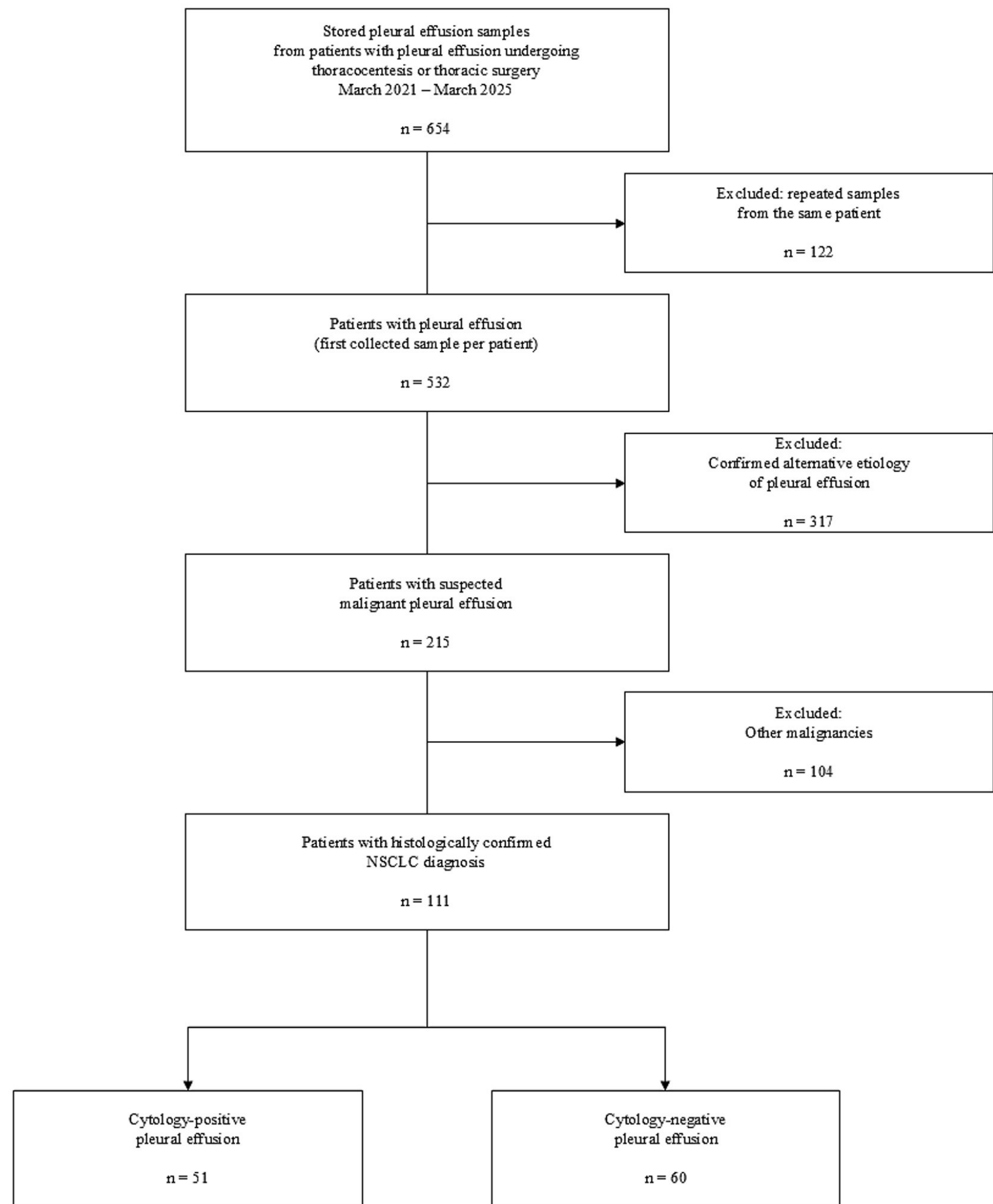
Pleural effusions are common in NSCLC. Positive cytology establishes metastatic disease, but sensitivity is limited and the prognostic relevance of cytology-negative effusions remains uncertain.

Objective:

To compare biochemical, cellular and cytokine profiles of cytology-positive (Cyt+) and cytology-negative (Cyt-) NSCLC-associated pleural effusions and determine their association with survival.

METHODS

Design: Retrospective analysis of a prospectively collected multicenter biobank.
Cohort: 111 NSCLC-associated effusions: 51 Cyt+ and 60 Cyt-; March 2021-March 2025.
Measurements: Pleural biochemistry, differential cell counts and 15-plex cytokine ELISA.
Analysis: One-year Kaplan-Meier/log-rank and Cox regression.



DISCUSSION AND CONCLUSION

Take-Home Messages:

- Cytology status defined stage, but not survival (Figure 1).
- Lower pleural NLR and higher absolute lymphocyte counts identified patients with better survival; the NLR signal was lymphocyte-driven (Figure 3).
- High pleural IL-4 and IL-5 levels were associated with improved survival, suggesting a prognostically favorable Th2-high signature (Figure 4).

Clinical implications:

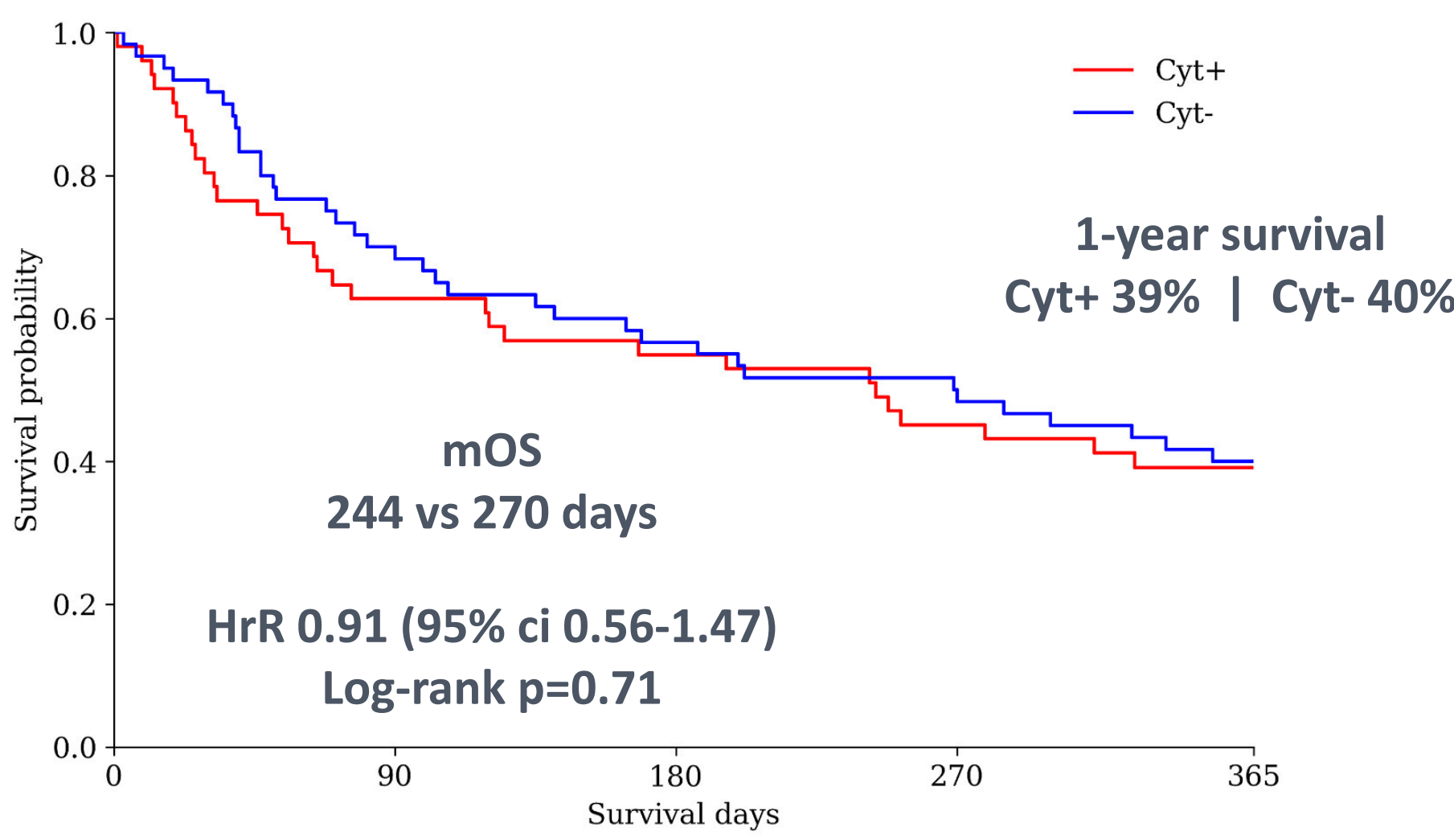
Negative cytology should not provide prognostic reassurance. Routine pleural differential counts may add risk information without additional sampling or cost.

Next step:

Prospective validation with prespecified immune phenotyping, molecular tumor data and treatment outcomes is required.

RESULTS I

Figure 1. Cytology did not stratify survival



REFERENCES & ACKNOWLEDGEMENTS

Reference: Lombardi M, Gerckens M, et al. Lung Cancer. 2026;219:109563. doi:10.1016/j.lungcan.2026.109563.
Funding: Gilead Sciences, Grant ID 25067. | **Competing interests:** None declared.
Acknowledgments: Patients and families; CPC-M bioArchive and partner institutions.
AI disclosure: OpenAI Codex was used for language condensation and layout support; scientific content and interpretation remain the responsibility of the authors.

RESULTS II

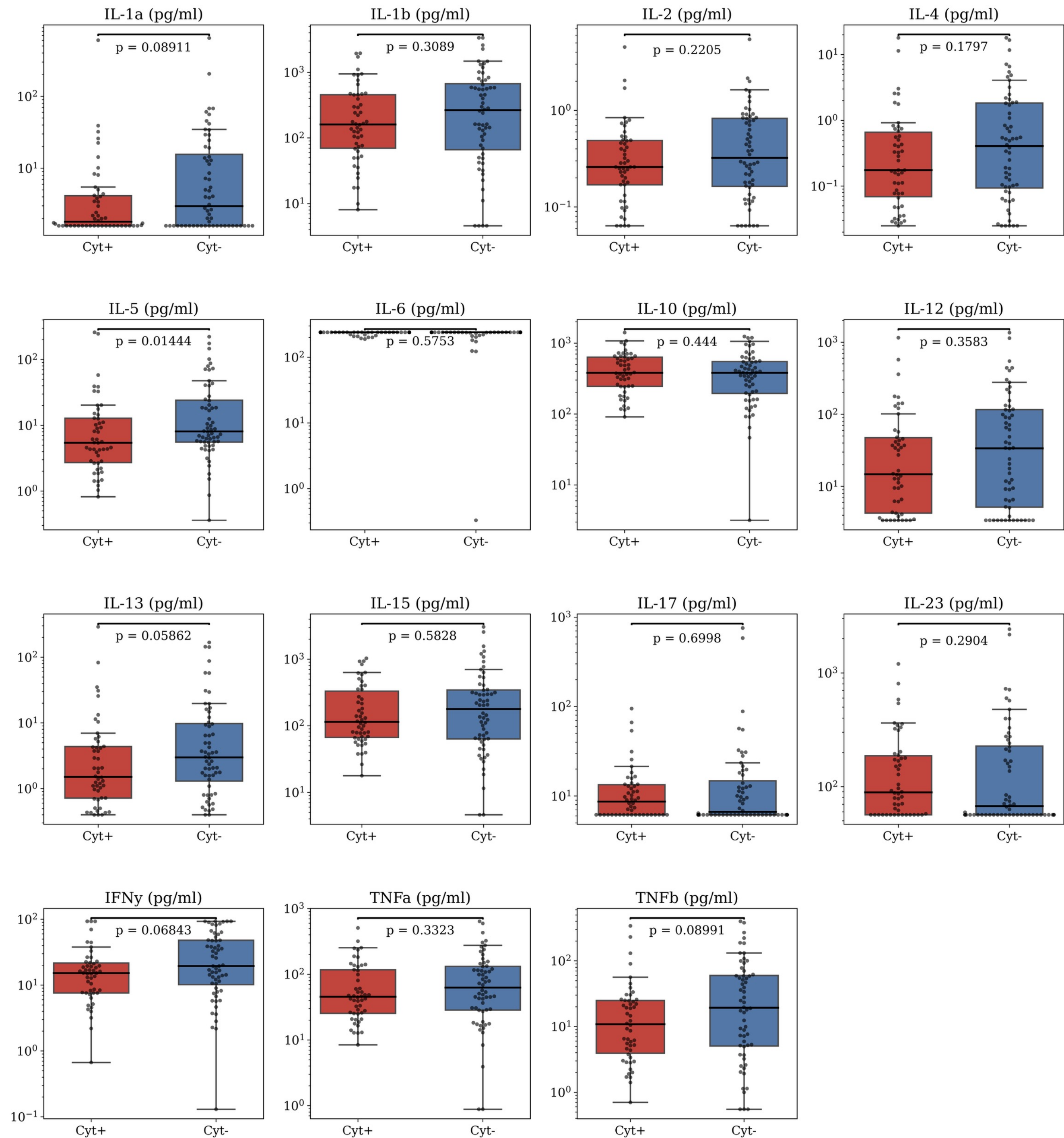


Figure 2. Distribution of cytokine levels in patients with Cyt+ and Cyt- subgroups showing no relevant differences between Cyt+ and Cyt- pleural effusions.

Figure 3. Pleural NLR (p=0.003) and absolute lymphocyte count (p<0.001) predicted survival; absolute neutrophil count did not (p=0.322).

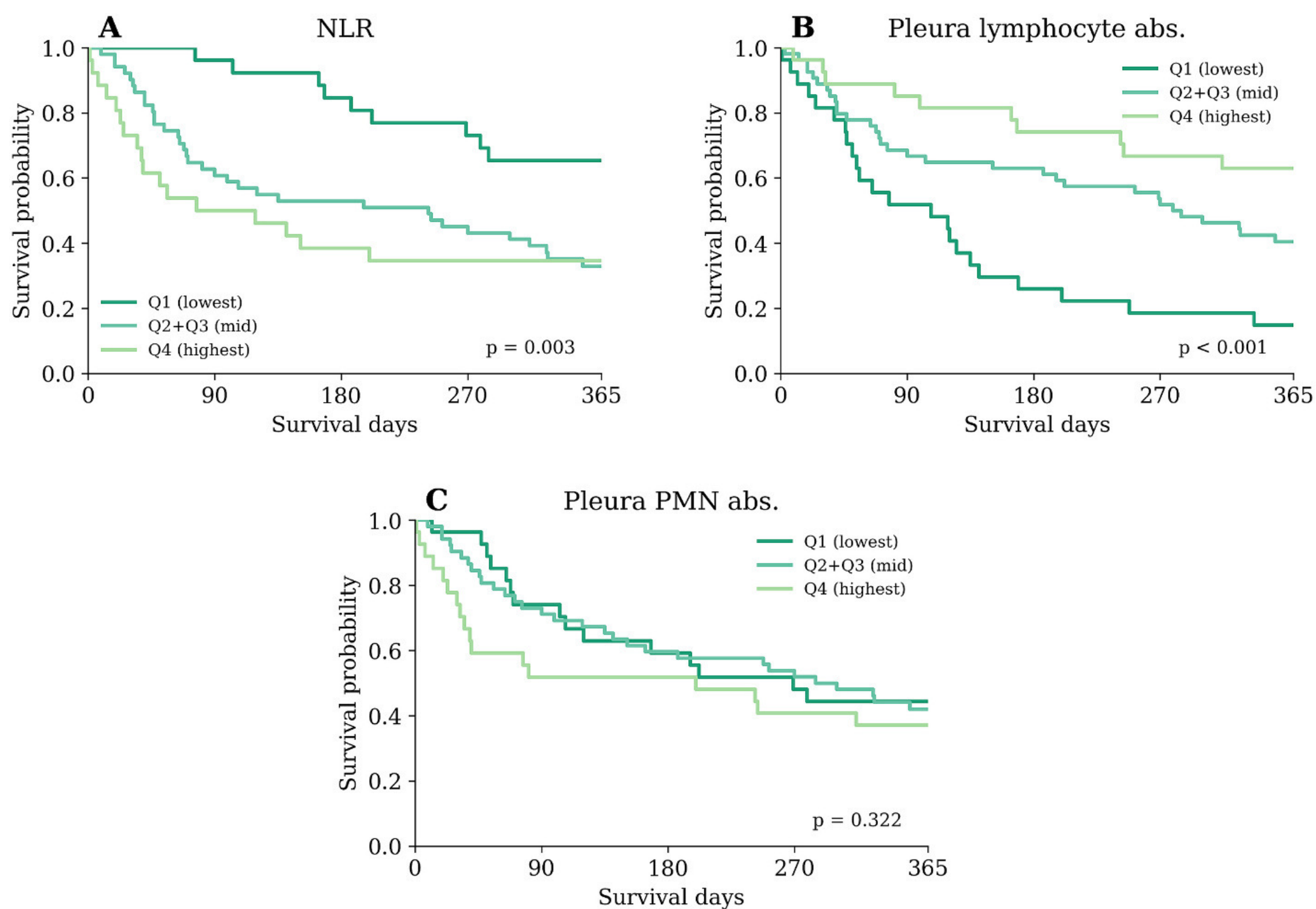


Figure 4. High IL-4 and IL-5 were associated with improved survival. Combined IL-4/IL-5-high status showed the strongest separation (p=0.0108).

