

Net Survival Following Lung Cancer Resection in the North-West England: A Pohar-Perme Estimator Analysis

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INTRODUCTION & AIM

- **Background mortality** refers to the risk of death in the general population, independent of the disease being studied (e.g., lung cancer) and it differs by age, sex, and calendar year.
- Overall survival reports cancer-related and unrelated deaths (competing risks).
- Net survival adjusts for competing risks, estimating cancer-specific survival.
- Using **relative or net survival**, we can estimate *“the survival that would be observed if lung cancer were the only possible cause of death.”*
- Pohar-Perme method provides unbiased population-adjusted estimates.
- The aim of this study is to quantify long-term, population-adjusted survival after lung resection for NSCLC in Northwest England.

METHOD

Study design:

A retrospective, population-referenced survival analysis

Study Population

- North-West Clinical Outcomes Research Registry Regional Audit Database: a database for surgically treated lung cancer patients in **Manchester & Liverpool** between 2012 - 2019

Inclusion:

- Curative-intent anatomic lung resection for primary Non small cell lung cancers

Exclusion:

- Metastatic disease
- Benign histopathology reports

Outcomes of Interest

- Overall survival
- Net survival reported annually post-surgery
- Standardised Mortality Ratio (SMR)

Statistical Approach:

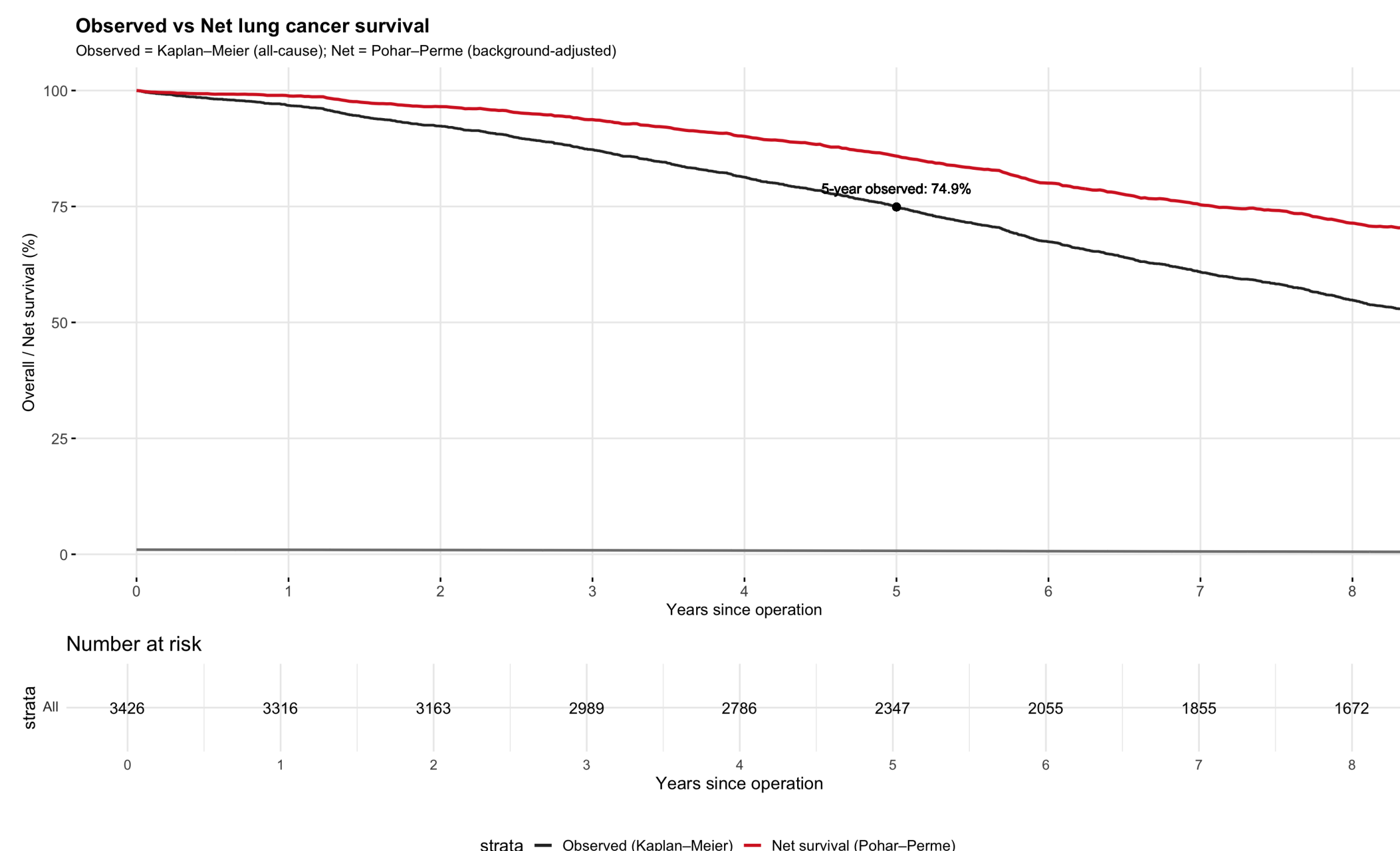
- UK life table from [Human Mortality Database](#) (sex, age, calendar year matched)
- Net survival estimated by [Pohar-Perme method](#) (*relsurv* package, in R programming language)

RESULTS & DISCUSSION

- Total number of patients [n] = 3,426
- Median follow-up = 58 months
- Stage I: 37%, Stage II: 40%
- Observed deaths [n]: 1,996
- Expected deaths [n]: 871
- Excess deaths [n]: 1,125
- Overall survival at 5th year: **74.9%**
- Net survival at 5th year: **85.8%**
- Standardised Mortality Ratio: **2.29** (95% Confidence Interval [CI]: 2.19 - 2.39)

Discussion

- Net survival consistently exceeds overall survival.
- Long-term mortality risk for operated lung cancer patients remains double than that of the background population.



CONCLUSION

- Surgery for early-stage lung cancers achieves excellent cancer-specific long-term survival.
- Relative survival estimation with population adjustment reveals the true long-term mortality burden of lung cancer.

FUTURE WORK / REFERENCES

- Future work 1: Hypothetical background mortality substitution Analysis of G7 nations: to determine the sensitivity of net survival estimation to the reference life table.
- Future work 2: Incorporating UK national background mortality risk in 5-year lung cancer survival predictor algorithm.

Perme MP, Stare J, Estève J. On estimation in relative survival. *Biometrics*. 2012;68(1):113-120. doi:10.1111/j.1541-0420.2011.01640.x

