VIVLI

DATA REUSE CASE STUDY

Does a patient's immune profile at diagnosis predict how they'll respond to cancer treatment?

Dr. Christian Lood
University of Washington

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BACKGROUND

Lung, colorectal, and gastric cancers account for more than 400,000 new cases and 180,000 deaths annually in the United States. Neutrophils, a type of white blood cell, play a complex and often counterintuitive role in cancer progression — promoting tumor growth, suppressing immune response, and driving metastasis. The neutrophil-to-lymphocyte ratio (NLR), derived from routine blood tests, has been proposed as an accessible prognostic marker. Inconsistent findings across studies, variable cut-off thresholds, and limited large-scale validation have kept it from widespread clinical adoption.

THE RESEARCHER

Dr. Christian Lood is an Associate Professor at the University of Washington specializing in neutrophil biology and biomarker development. His team sought to determine whether NLR could reliably predict survival outcomes across solid tumor types, and to identify which patient subgroups might benefit most from biomarker-guided clinical decision-making.

> ***I wanted to highlight the unique role of neutrophils in cancer to hopefully further development of novel biomarkers as well as therapeutic targets that are currently not considered in the field.***
>
> - Dr. Christian Lood

THE QUESTION

Does baseline NLR — alongside absolute neutrophil and lymphocyte counts — independently predict overall survival and progression-free survival across lung, colorectal, and gastric cancers?

And does its predictive value hold consistently across different patient populations, disease stages, and treatment arms?

Vivli Data Request: 00009235

> ***Access to data through Vivli allowed us to analyze a larger patient population and wider variety of treatments than would have been feasible in a standard clinical setting.***
>
> - Dr. Christian Lood

THE DATA

To answer these questions at scale, the team needed individual patient data from multiple large clinical trials. **Through Vivli, Dr. Lood's team requested data from six Phase III trials** and received records from five, all **sponsored by Eli Lilly and Company**, spanning lung, colorectal, and gastric cancers.

5 trials accessed	**4,484** patients analyzed
3 cancer types	**6** time-point biomarker assessments

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CENTER FOR GLOBAL CLINICAL RESEARCH DATA

KEY FINDINGS

- Patients with higher baseline NLR had significantly shorter overall survival and faster disease progression across all three cancer types
- Baseline NLR was an independent predictor of overall survival (HR: 1.508) and progression-free survival (HR: 1.261) after adjusting for age, sex, and disease stage
- Predictive performance was strongest in patients under 60, non-White patients, those with Stage IV disease, and those with lower functional status at baseline — underscoring the need for subgroup-specific biomarker interpretation rather than uniform thresholds
- Longitudinal NLR change did not improve on baseline measurement, suggesting the initial reading carries the primary prognostic signal

  A cut-off of approximately 3.3 demonstrated the best balance of sensitivity and positive predictive value across analyses

IMPACT

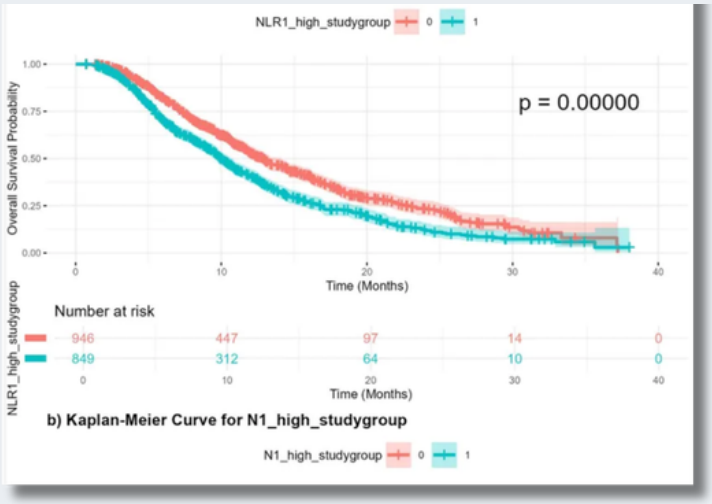
Published in *Frontiers in Oncology* in July 2025, this study is among the most comprehensive analyses of NLR across solid tumor types to date. Findings strengthen the case for integrating NLR into routine oncology risk stratification and point toward its potential utility in identifying patients who may benefit from more aggressive treatment or neutrophil-targeted therapy.

NEXT STEPS

This study sets the stage for prospective validation of NLR cut-off values across tumor types and patient subgroups. Dr. Lood also highlights an emerging research direction: moving beyond cell counts toward soluble markers of neutrophil activation, which may offer greater sensitivity in identifying patients with poor prognosis — particularly in diseases where early intervention is critical.

For researchers interested in exploring similar questions, individual patient data from the five trials used in this analysis are available through Vivli.

Request data through Vivli



Kaplan–Meier Curve for NLR1_high_study_studygroup

READ THE PUBLICATION

Performance of the neutrophil-to-lymphocyte ratio as a prognostic tool for survival in solid cancers

— *Frontiers in Oncology* (July 2025)