# Sociodemographic And Clinical Factors Associated With Time To Treatment Initiation And Care Pathways In Non-Metastatic Non-Small Cell Lung Cancer In Colombia: A Real-World Evidence Study

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## Background

Lung cancer is the leading cause of cancer incidence (12.4%) and mortality (18.7%) in both sexes worldwide[1]. In non-small cell lung cancer (NSCLC), timely treatment initiation is critical, particularly in earlier stages where curative-intent strategies may still be feasible[2,3]. In Colombia, around 70% of all cases were metastatic at the time of diagnosis and time to treatment initiation remains above the 30-day national target, highlighting persistent delays in care[4]. However, detailed real-world evidence from Latin America on stage-specific treatment timelines, associated clinical factors, and their implications remains limited.

## Objectives

In patients with non metastatic NSCLC in Colombia:

- To characterize time to treatment initiation (TTI).
- To identify clinical factors associated with TTI.
- To describe treatment patterns by stage and modality.

## Methods

### Study design

Retrospective, **multicenter** observational study using **real-world data** from 3 oncology centers in Colombia

### Population

- ★ Adults with NSCLC **stages IA–IIIC**
- ★ Diagnosed between 2017–2024

### Sources

Data was extracted retrospectively from electronic health records and recollected using REDCap.

### Analysis

Sociodemographic and clinical characteristics were described to characterize the study population and contextualize treatment patterns by stage and modality. Time-to-event methods were used to evaluate factors associated with TTI (time between diagnosis and first oncologic treatment). Kaplan–Meier estimation described treatment timing, while log-rank tests compared TTI across patient groups to identify variables potentially associated with delays. Multivariable Cox proportional hazards modeling was then used to identify factors independently associated with TTI after adjustment for relevant covariates, with stepwise variable selection with assessment of the proportional hazards assumption. Subgroup analyses explored differences according to tumor resection eligibility, screening detection, and diagnostic method. Associations were reported as hazard ratios with 95% confidence intervals.

## Results

A total of 228 patients were included, 51.5% of whom were women. The median age at diagnosis was 69.9 years (IQR: 63.9–76.4). A mutation was found in 9.2% of participants, with EGFR being the most common (7.02%). Overall, 28.1% of patients were identified through a **screening program**; of these, **53.1% were diagnosed at Stage I and 29.7% at Stage III.** In contrast, among those identified through **non-screening programs**, **22.4% were Stage I and 55.9% were Stage III**. Treatment patterns varied by stage, with surgery being the most common approach in stage I (54.9%), surgery plus adjuvant therapy in stage II (45.7%), and systemic therapy in stage III (37.3%).

### Time to treatment initiation

The **median TTI was 78 days (IQR 47.5-126) for the entire cohort**. Univariate analysis **(Table 1)** showed sex, comorbidities measured with the Charlson score, BMI and stage at diagnosis as possible factors related with TTI.

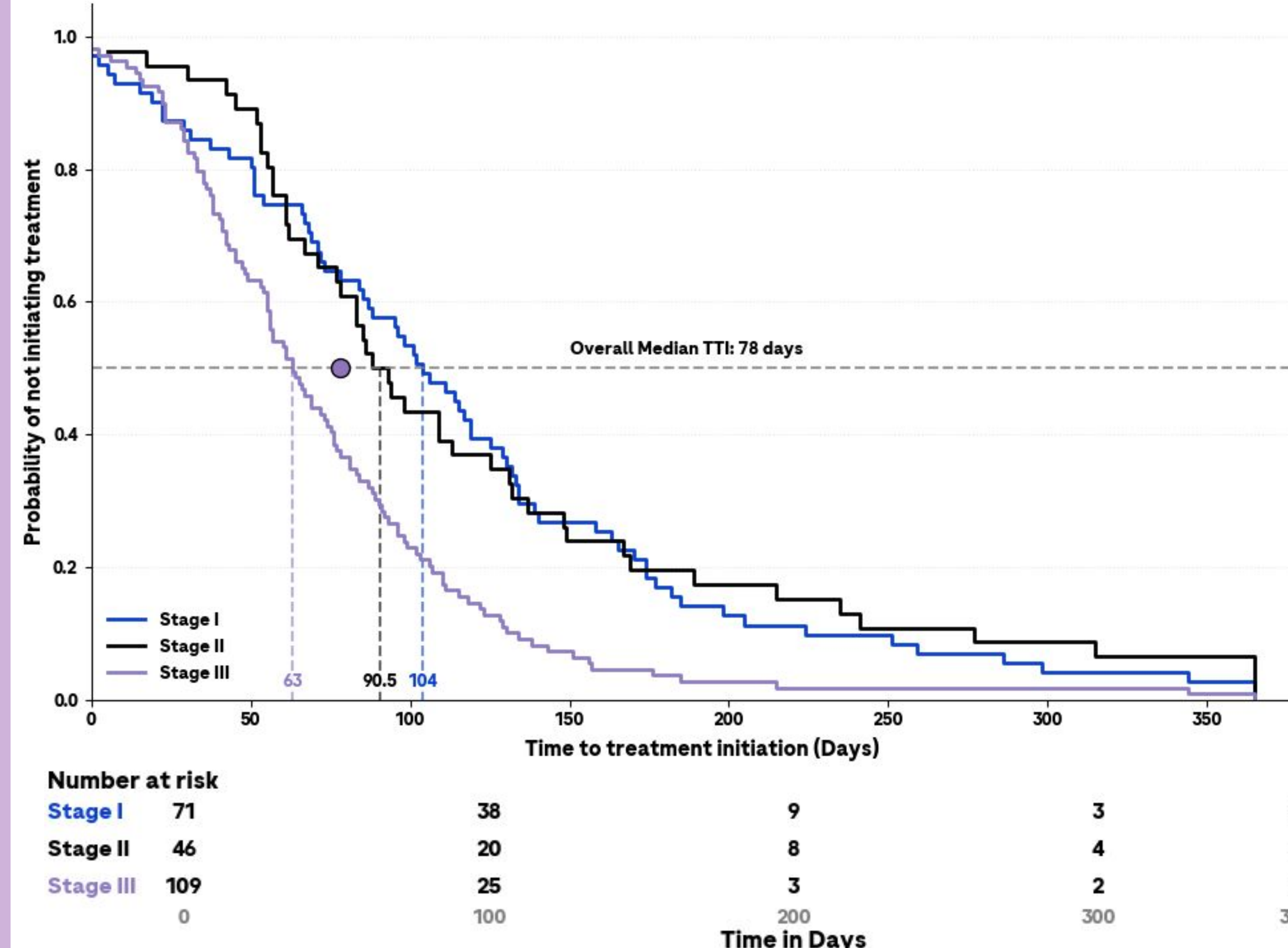
While socioeconomic strata, occupation, smoking status, insurance scheme, ECOG functional scale were not statistical significant factors associated with TTI.

**Table 1. Median TTI by sociodemographic and clinical characteristics.**

| Characteristic | n (%) | Median TTI (IQR) | Characteristic | n (%) | Median TTI (IQR) |
|---|---|---|---|---|---|
| **Age at diagnosis** | | | **Insurance** | | |
| >=60 | 192 (84.2) | **85 (53.5-129)** | Contributory | 189 (82.9) | **85.5 (55-130)** |
| <60 | 36 (15.8) | 52 (32.8-95.8) | Subsidized | 39 (17.1) | 45 (31-85) |
| **Sex** | | | **Charlson Score** | | |
| Female | 117 (51.3) | **89 (51-130)** | >2 | 117 (51.3) | **88 (56-130)** |
| Male | 111 (48.7) | 73.5 (45-120) | <=2 | 111 (48.7) | 70.5 (37.2-108) |
| **Body mass index (BMI)** | | | **Smoking status** | | |
| Underweight | 17 (7.7) | 75 (47-123) | Current | 16 (7.2) | 76 (54.8-129) |
| Normal weight | 129 (58.4) | **84 (51-134)** | Former | 158 (71.5) | 83 (49.2-129) |
| Overweight | 75 (33.9) | 74 (48.5-118) | Never smoked | 47 (21.3) | 80 (38.5-127) |

Stage at diagnosis **(unadjusted HR 1.87 CI 95% 1.38-2.55 )** was found to be the most important factor associated with time to treatment initiation, with patients diagnosed at Stage III initiating treatment faster **(Figure 1)**.

**Figure 1. Kaplan-Meier curve of time to treatment initiation by stage at diagnosis.**

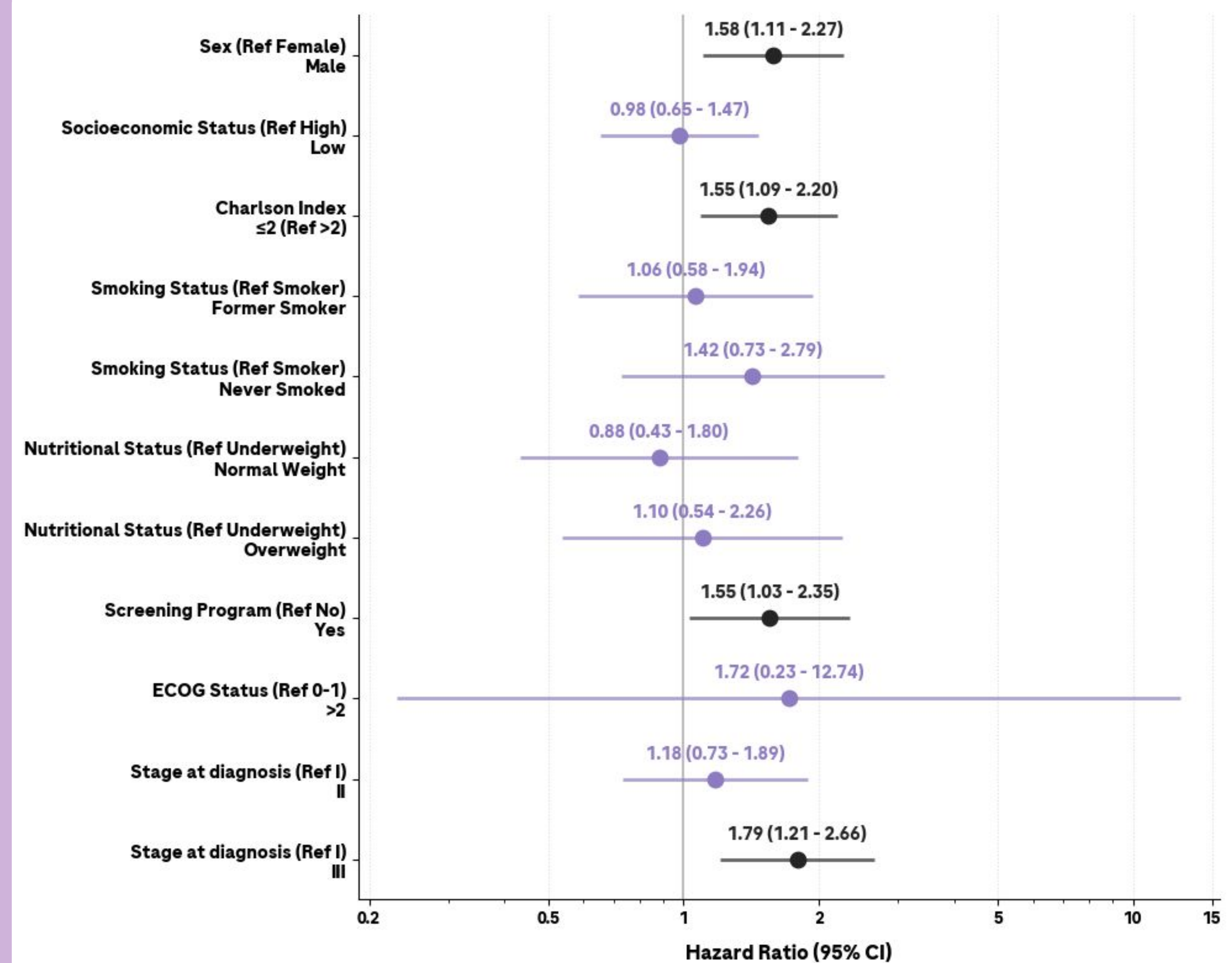



The curve represents the probability of remaining untreated over time. In this context, a **steeper decline indicates faster treatment initiation**, whereas a more gradual slope reflects longer delays. The curve for stage III disease declines more rapidly, indicating that these patients initiate treatment earlier than those in earlier stages.

### Multivariate analysis

Stage III diagnosis, male sex, screening-detected status and lower Charlson comorbidity score were confirmed as independent significant factors associated with shorter TTI, increasing it's probability by 79%, 58%, 55% and 55%, respectively **(Figure 2)**. Testing confirmed that the final model met the proportional hazards assumption. These findings were consistent with the shorter median TTI observed across these groups in the descriptive analysis **(Table 1)**.

**Figure 2. Forest plot of time to treatment initiation by sociodemographic and clinical variables**




In the Cox proportional hazards model**,** the event was treatment initiation; therefore, HRs >1 indicate a higher rate of treatment initiation and shorter TTI compared with the reference group (HR=1).

## Conclusion

In this NSCLC cohort, limited screening uptake and a high proportion of stage III diagnoses were observed alongside prolonged TTI. Although patients with stage III disease started treatment more rapidly than others, the overall time to treatment initiation still exceeded national targets by more than twofold, suggesting a reactive care pathway in which treatment is prioritized once disease has progressed rather than through earlier diagnosis and treatment at less advanced stages.

Strengthening early detection policies and scaling screening programs, alongside optimized referral pathways, are critical to shifting treatment initiation to earlier stages and reducing clinical delays. Beyond significantly improving patient survival and quality of life, prioritizing early intervention fosters a more efficient health system; as treating conditions in earlier stages is less resource-intensive.

## References

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