



Patterns and Predictors of Lung Cancer Care Trajectories: A Sequence Analysis of Insurance Claims

Takeaway Message: Lung cancer care is not one-size-fits-all — trajectories vary by patient profile and cost dynamics, calling for personalized, equity-focused policies.

Yue Xu¹, Xiaozhu An¹, Yixin Liu¹, Min Hu¹, Wen Chen¹
¹Fudan University, School of Public Health, Shanghai, China

HSD64



OBJECTIVE

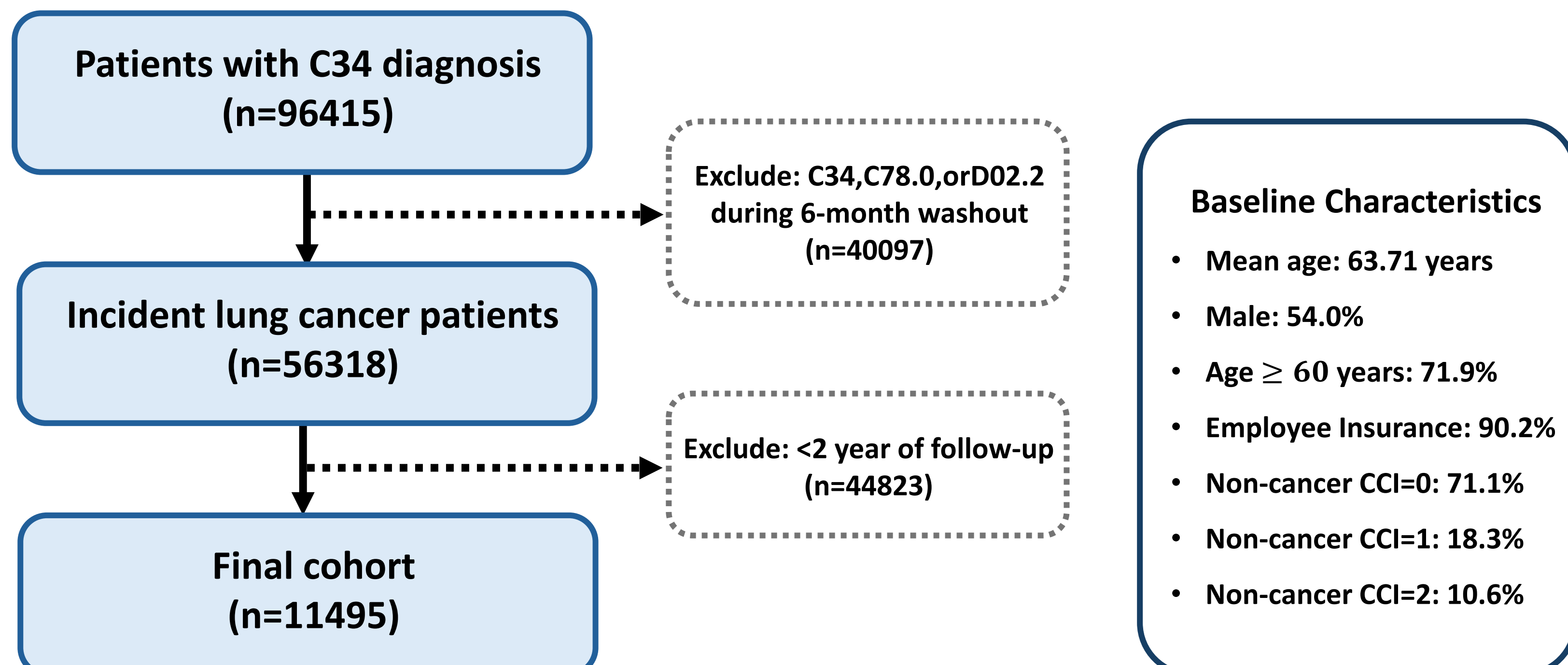
To identify dominant care trajectories among newly diagnosed lung cancer patients, examine predictors of trajectory membership, and compare cumulative and quarterly economic burden across trajectory classes.

BACKGROUND

- Lung cancer remains a leading cause of morbidity and mortality in China and a major driver of healthcare spending.
- Prior work organises care by treatment category or phase-of-care averages; trajectory analyses are limited to selected subgroups in high-income settings.
- Sequence analysis of claims data can identify meaningful care trajectories and associated economic burden.

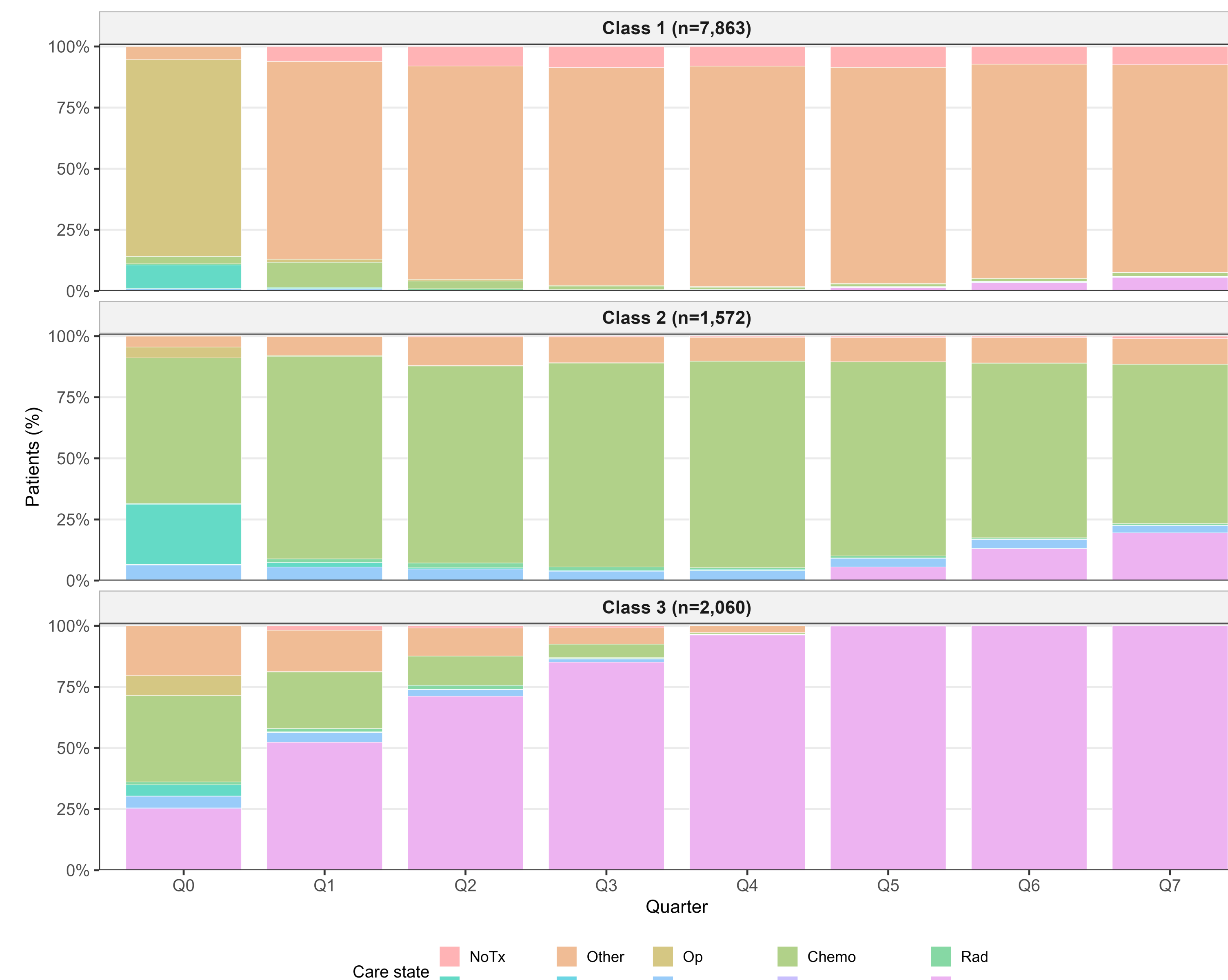
METHODS

- Data Source:** Shanghai social health insurance claims (2022–2024); 11,495 incident lung cancer patients with 2-year follow-up.
- Trajectory Construction:** Quarterly care states over 8 quarters; 10 states covering surgery, chemotherapy, radiotherapy, their combinations, other care, no treatment, and death.
- Analytical Approach:**
 - Sequence analysis:** pairwise sequence dissimilarity
 - CLARA:** trajectory clustering
 - Multinomial logistic regression:** predictors of class membership



RESULTS 1: THREE CARE TRAJECTORIES

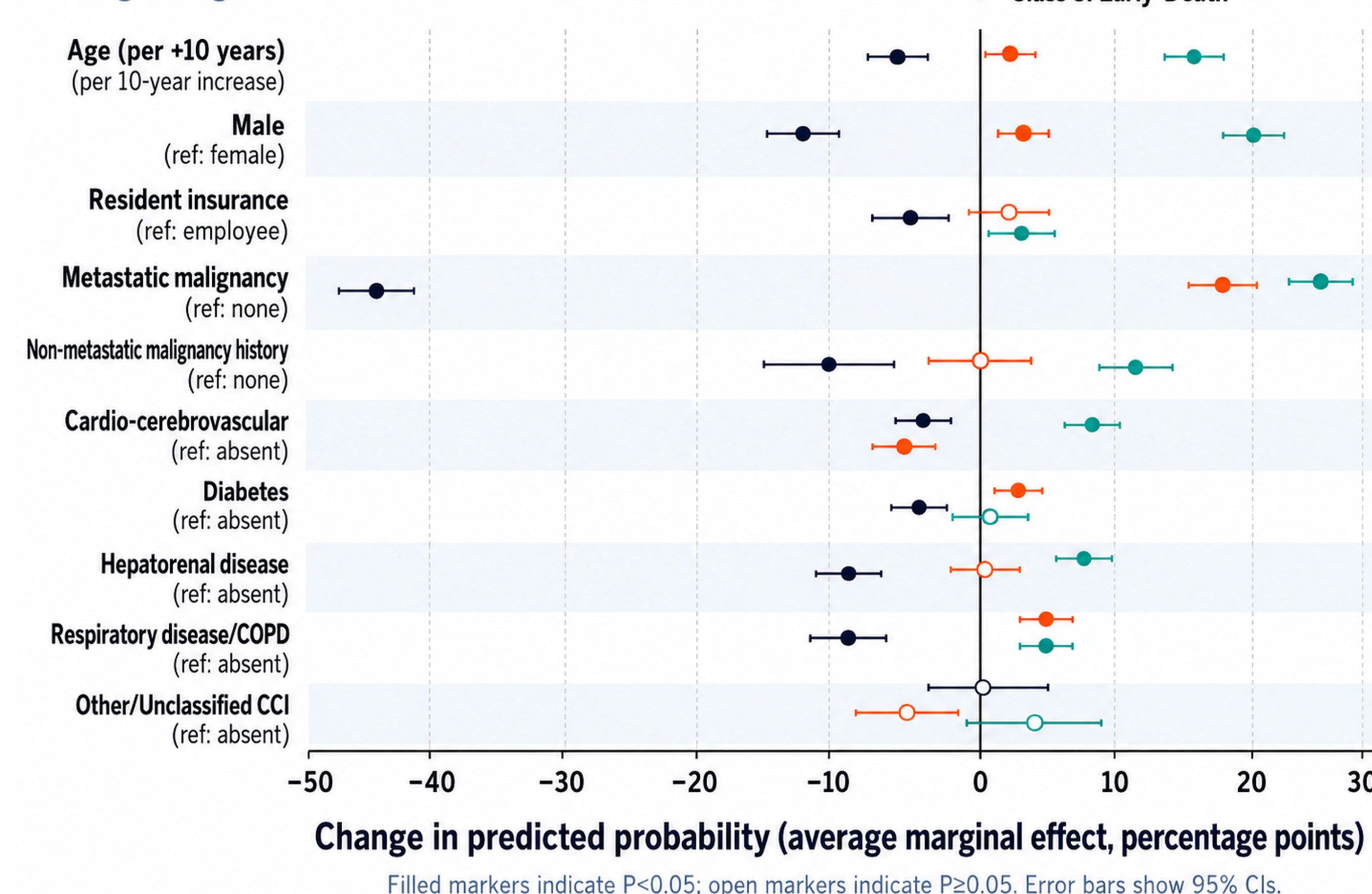
- Class 1: Surgery-Dominant (68.4%)** – Upfront surgery, then transition to other care; low mortality.
- Class 2: Persistent Chemotherapy (13.7%)** – Sustained systemic treatments across multiple quarters.
- Class 3: Early-Death (17.9%)** – Rapid transition to death after limited active treatment.



RESULTS 2: PREDICTORS OF TRAJECTORY MEMBERSHIP

Predictors of Trajectory Membership

Average marginal effects with 95% confidence intervals



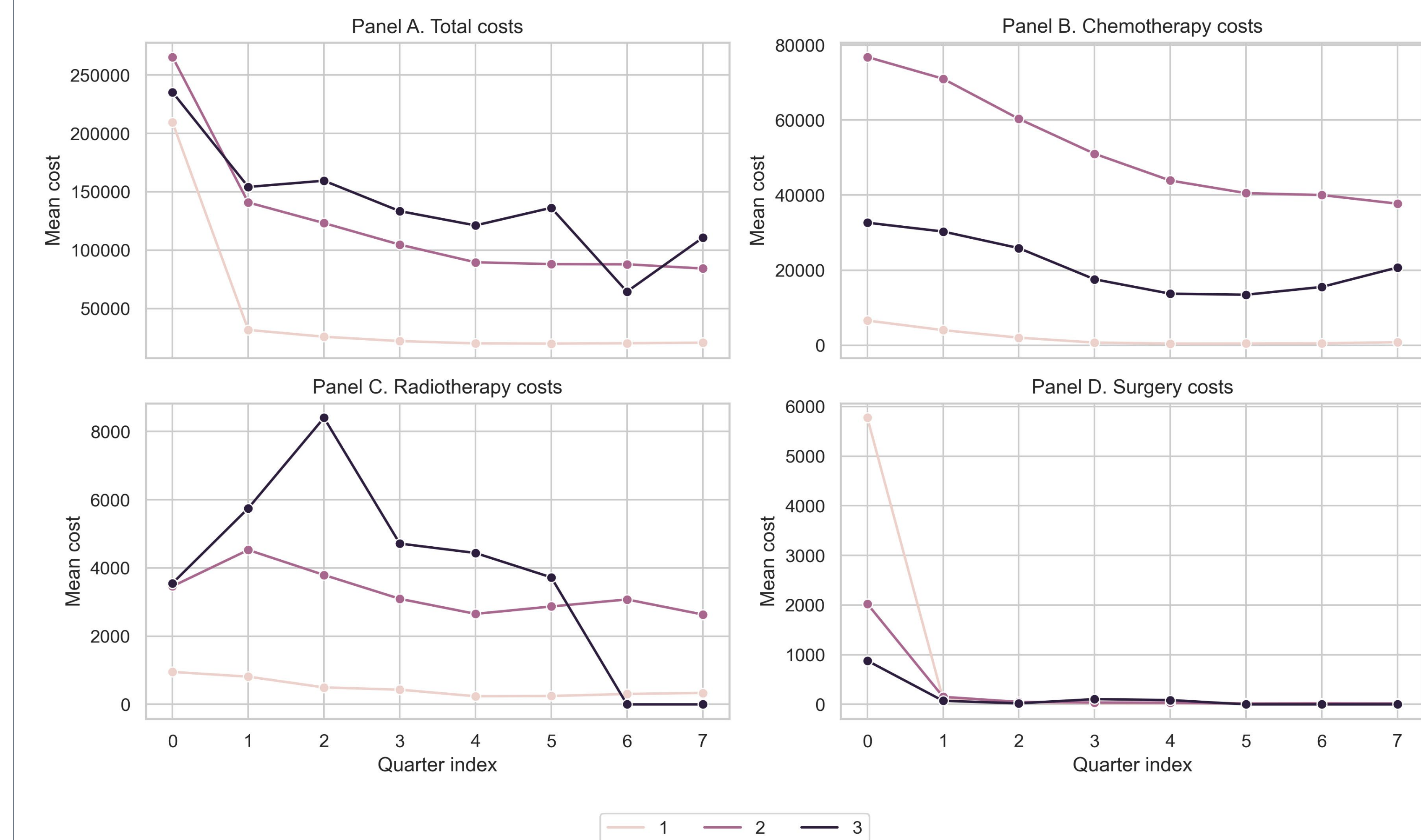
RESULTS 3: ECONOMIC BURDEN

Cumulative Cost:

- Class 2 averaged USD 133,156, Class 3 USD 57,631, and Class 1 USD 49,551.

Three Distinct Cost Dynamics:

- Class 1:** Front-loaded surgical spending dropping to low-cost maintenance.
- Class 2:** Sustained, high-intensity spending driven by targeted therapies.
- Class 3:** Healthcare costs concentrated within a short pre-death window.



CONTRIBUTIONS

- First application of state sequence analysis to a population-based incident lung cancer cohort covering the full severity spectrum in a middle-income setting.
- Lung cancer care inequity in this setting extends beyond differences in healthcare costs to differences in the care pathway patients receive.
- Linking trajectory classes to quarterly cost data reveals expenditure patterns that phase-of-care averages cannot capture.