

# Impact of COVID-19 Pandemic on Survival Outcomes in Non-Small Cell Lung Cancer

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## Background

- COVID-19 pandemic resulted in healthcare disruptions and delays of care for patients
- Delays between diagnosis and treatment, and shifts towards higher stages at time of diagnosis were seen in patients with lung cancer
- There are mixed results of the effects of the pandemic on outcomes amongst patients with all types of lung cancer

**Knowledge Gap: The long-term impact across patients with non-small cell lung cancer (NSCLC) remains unexplored in the United States.**

## Goal of This Study

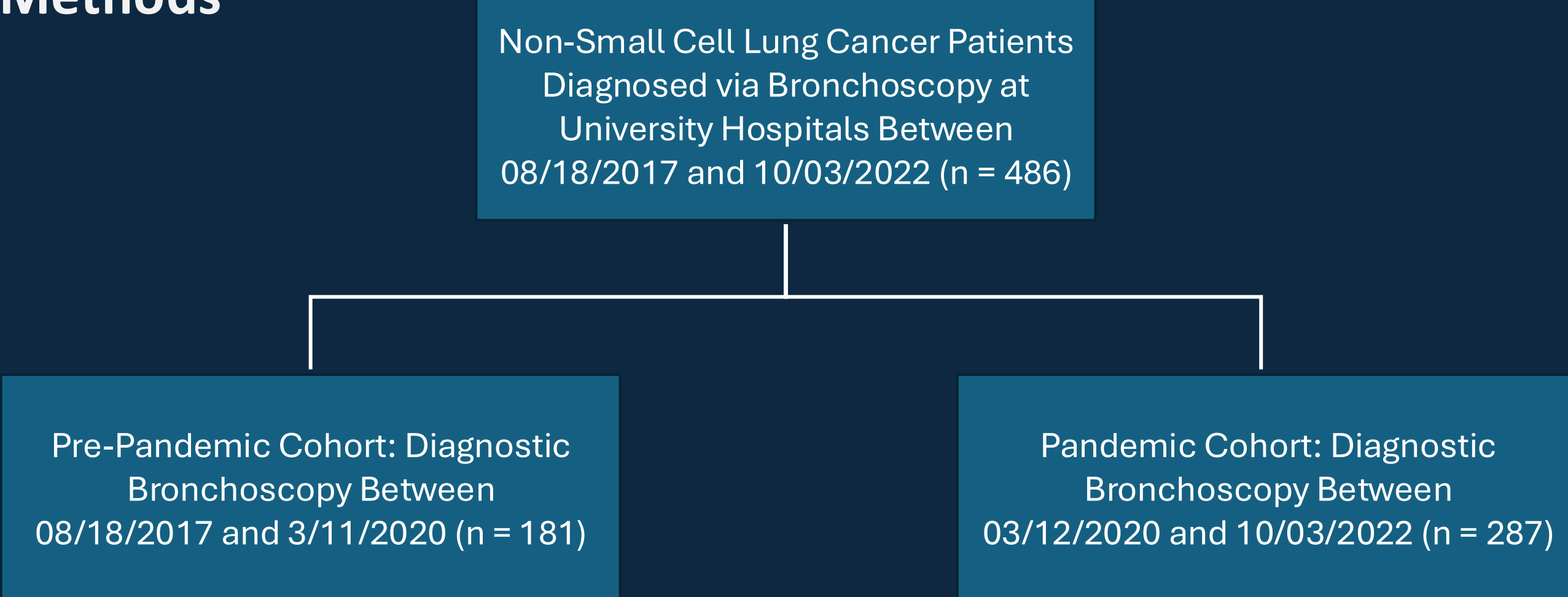
Evaluate the impact of the pandemic on survival in NSCLC, assessing 1- and 2-year, and 5-year survival data for both pre-pandemic and pandemic cohorts.

## Patient Characteristics

| Patient Characteristic                                                                                       | Pre-pandemic (N = 181) | Pandemic (N = 287) | p-value |
|--------------------------------------------------------------------------------------------------------------|------------------------|--------------------|---------|
| <b>Sex</b>                                                                                                   |                        |                    |         |
| Male                                                                                                         | 72 (39.78)             | 134 (46.69)        | 0.170   |
| Female                                                                                                       | 109 (60.22)            | 153 (53.31)        |         |
| <b>Race</b>                                                                                                  |                        |                    |         |
| Black                                                                                                        | 57 (31.49)             | 73 (25.44)         | 0.326   |
| White                                                                                                        | 122 (67.40)            | 210 (73.17)        |         |
| Asian                                                                                                        | 2 (1.10)               | 2 (0.70)           |         |
| Other                                                                                                        | 0 (0.00)               | 2 (0.70)           |         |
| <b>Smoking Status</b>                                                                                        |                        |                    |         |
| Current smoker                                                                                               | 61 (33.70)             | 93 (32.40)         | 0.988   |
| Prior smoker (>1 pack/year)                                                                                  | 101 (55.80)            | 162 (56.45)        |         |
| Never smoker (≤1 pack/year)                                                                                  | 18 (9.94)              | 30 (10.45)         |         |
| Unknown                                                                                                      | 1 (0.55)               | 2 (0.70)           |         |
| <b>ECOG Performance Status</b>                                                                               |                        |                    |         |
| 0                                                                                                            | 52 (28.73)             | 65 (22.65)         | 0.154   |
| 1                                                                                                            | 63 (34.81)             | 106 (36.93)        |         |
| 2                                                                                                            | 42 (23.20)             | 83 (28.92)         |         |
| 3                                                                                                            | 8 (4.42)               | 16 (5.57)          |         |
| 4                                                                                                            | 0 (0.00)               | 3 (1.05)           |         |
| Not reported                                                                                                 | 16 (8.84)              | 14 (4.88)          |         |
| <b>Metastasis</b>                                                                                            |                        |                    |         |
| Yes                                                                                                          | 69 (38.12)             | 107 (37.28)        | 0.720   |
| No                                                                                                           | 112 (61.88)            | 179 (62.37)        |         |
| Unknown                                                                                                      | 0 (0.00)               | 1 (0.35)           |         |
| <b>Lines of Therapy</b>                                                                                      |                        |                    |         |
| 0                                                                                                            | 16 (8.84)              | 15 (5.23)          | 0.084   |
| 1                                                                                                            | 109 (60.22)            | 198 (68.99)        |         |
| 2                                                                                                            | 39 (21.55)             | 53 (18.47)         |         |
| 3                                                                                                            | 8 (4.42)               | 16 (5.57)          |         |
| 4                                                                                                            | 3 (1.66)               | 4 (1.39)           |         |
| 5                                                                                                            | 4 (2.21)               | 1 (0.45)           |         |
| 6                                                                                                            | 2 (1.10)               | 0 (0.00)           |         |
| <b>Treatment</b>                                                                                             |                        |                    |         |
| Yes                                                                                                          | 168 (92.82)            | 275 (95.82)        | 0.224   |
| No                                                                                                           | 13 (7.18)              | 12 (4.18)          |         |
| <b>Death</b>                                                                                                 |                        |                    |         |
| Yes                                                                                                          | 90 (49.72)             | 129 (44.95)        | 0.361   |
| No                                                                                                           | 91 (50.28)             | 158 (55.05)        |         |
| <b>Histology</b>                                                                                             |                        |                    |         |
| Adeno                                                                                                        | 111 (61.33)            | 162 (56.45)        | 0.521   |
| Squamous                                                                                                     | 47 (25.97)             | 88 (30.66)         |         |
| Other                                                                                                        | 23 (12.71)             | 37 (12.89)         |         |
| <b>Follow-up Time (day)<sup>1</sup></b><br>(Date of diagnostic bronchoscopy to Date of Last known follow-up) | 856 [175, 2066]        | 966 [266, 1306]    | 0.022*  |

1: Median, IQR [Q1, Q3]

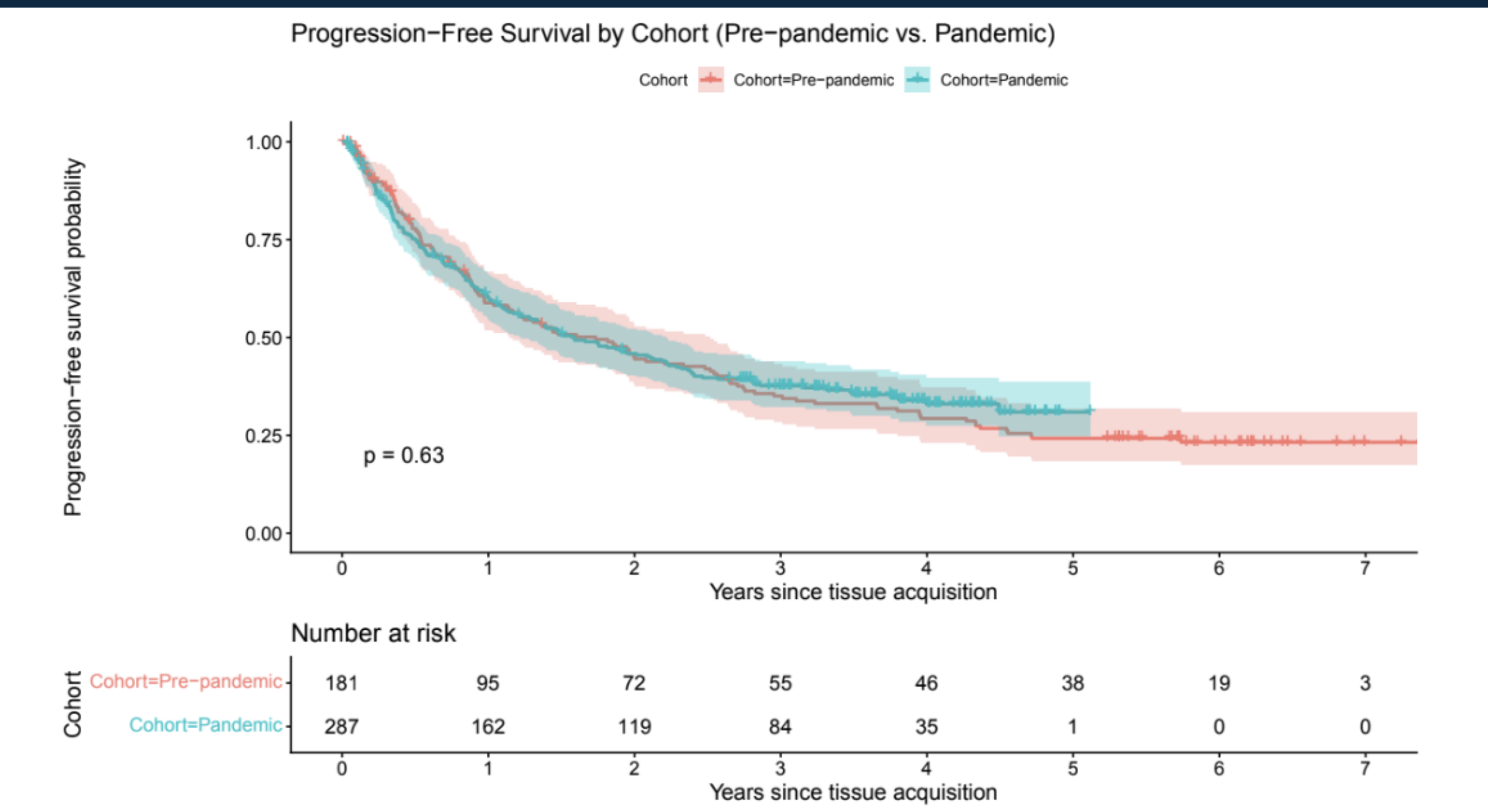
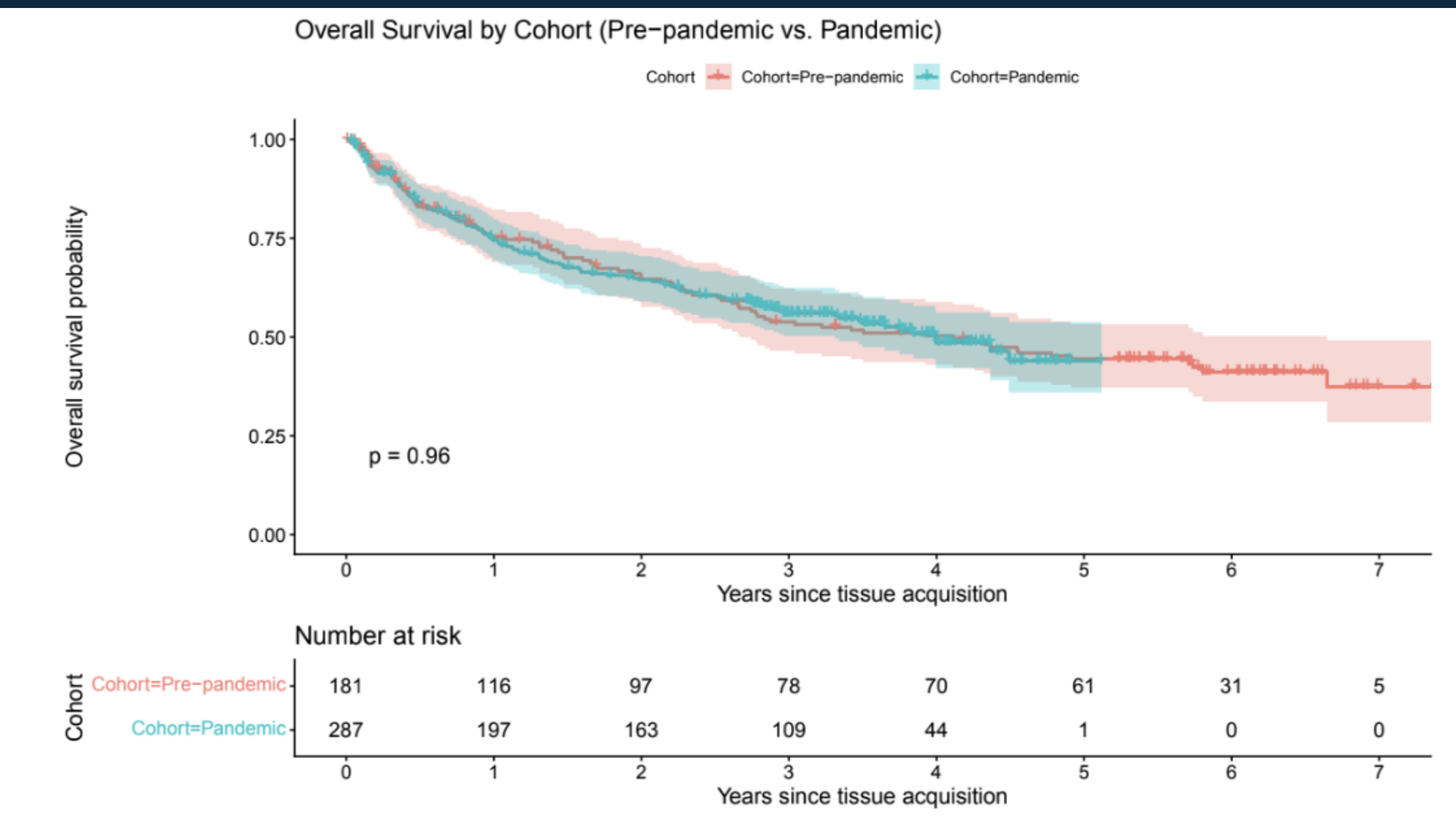
## Methods



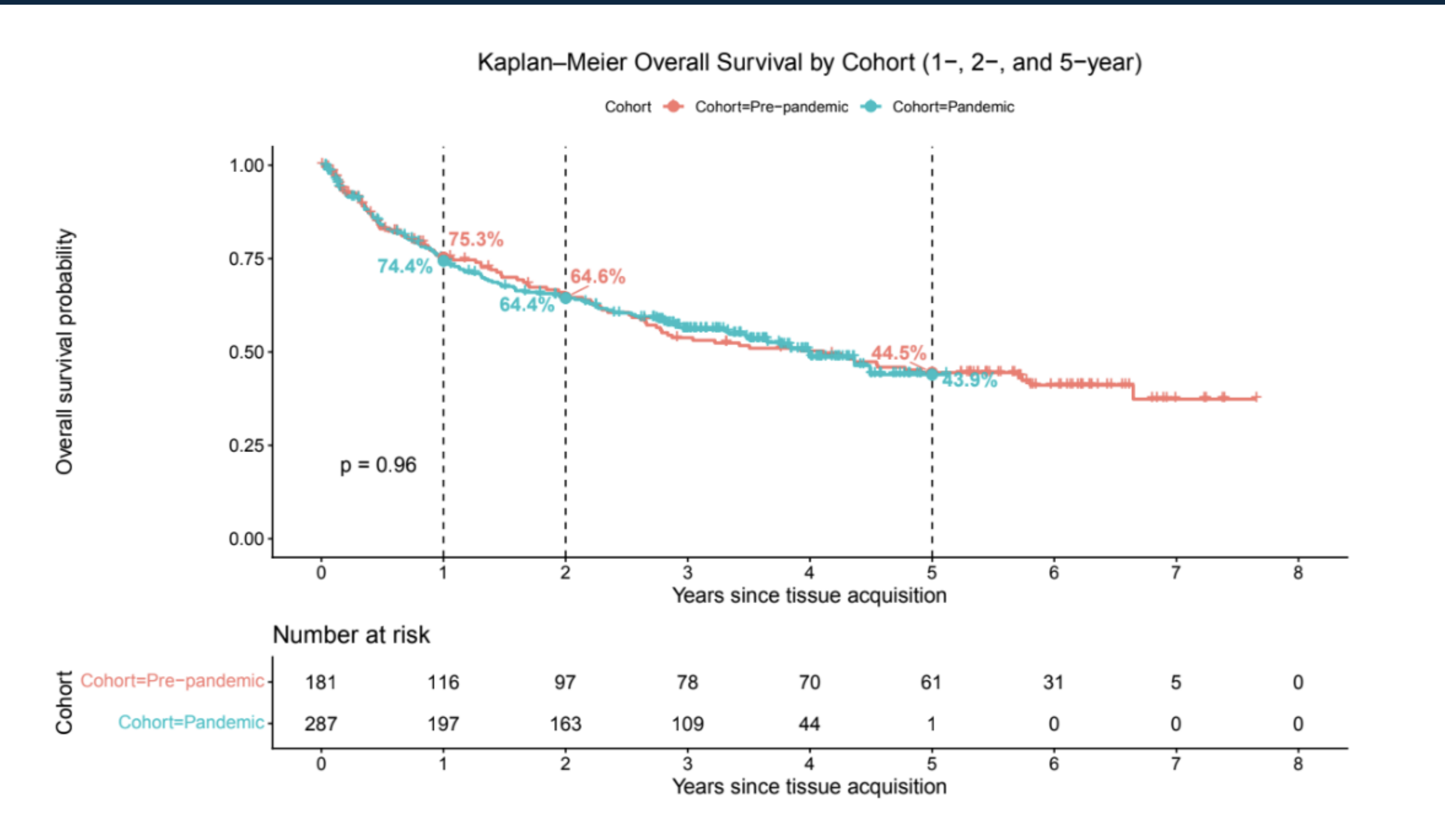
**Primary Outcomes:** Overall Survival (date of bronchoscopy to death or last known follow-up) and Progression Free Survival (date of bronchoscopy to either radiologic or pathologic progression or death)

**Statistical Analysis:** Survival functions were estimated by Kaplan–Meier methods, and the log-rank test was used to compare between cohorts. One-, two-, and five-year OS probabilities with 95% confidence intervals were derived from the Kaplan–Meier estimates

## Primary Outcomes



## Kaplan-Meier Overall Survival by Cohort (1-, 2-, and 5- year)



| Pre-Pandemic Cohort |          |               | Pandemic Cohort |          |               |
|---------------------|----------|---------------|-----------------|----------|---------------|
| Time                | Survival | 95% CI        | Time            | Survival | 95% CI        |
| 1 years             | 75.3%    | 69.0% - 82.2% | 1 years         | 74.4%    | 69.4% - 79.8% |
| 2 years             | 64.4%    | 57.6% - 72.5% | 2 years         | 64.6%    | 59.0% - 70.4% |
| 5 years             | 44.5%    | 37.2% - 53.2% | 5 years         | 43.9%    | 35.9% - 53.7% |

## Conclusions and Future Directions

- There is no statistically significant difference in long-term OS or PFS between those diagnosed before and during the pandemic in this single-site retrospective analysis of NSCLC patients.
- Although limited by single-institution and small sample size, we are the first to examine longer term survival in NSCLC patients in the United States
- Future larger scale studies are necessary to further characterize this relationship.
- Additional studies to characterize long-term outcomes across all lung cancer patients are also necessary.

## Acknowledgements

Case Western Reserve University School of Medicine  
University Hospitals Seidman Cancer Center

## References

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