

P1.041 Differential Lung Cancer Prevalence by Concurrent Plcoci and PLCom2012 Stratification: The LEAP Multicenter Study

Jeong Uk Lim^{1,2}, Jennifer B. Dennison³, Sebastien Gendarme⁴, Samir M. Hanash³, Edwin J. Ostrin⁵

¹Division of Pulmonary, Critical Care and Sleep Medicine, Department of Internal Medicine, Yeouido St. Mary's Hospital, College of Medicine, The Catholic University of Korea, Seoul, Republic of Korea, ²Department of Investigational Cancer Therapeutics, The University of Texas MD Anderson Cancer Center, Houston, TX, United States, ³Department of Cancer Prevention, The University of Texas MD Anderson Cancer Center, Houston, TX, ⁴Service de Pneumologie, Hôpital Tenon, APHP, Inserm U955, IMRB, Université Paris-Est Créteil, F-94010 Créteil, France, ⁵Department of Pulmonary, Critical Care and Sleep Medicine, NYU Langone Health, New York, NY 10016, USA **Correspondence:** edwin.ostrin@nyulangone.org

INTRODUCTION

- **PLCom2012** predicts 6-year lung cancer risk, however, it does not account **competing mortality** (non- lung cancer) (1).
- **PLCOci**: A regularized Cox model predicting five-year **non-lung cancer mortality**. PLCOci outcome was defined as non-lung cancer mortality to avoid overestimating the contribution of comorbidities that simultaneously drive lung cancer risk and **competing mortality** (2).
- Concurrent use of the two indices has never been tested in an LDCT screening cohort.

AIM Does concurrent PLCOci × PLCom2012 stratification yield differential lung cancer prevalence? How do baseline characteristics differ?

METHODS

- **LEAP** — prospective multicenter LDCT screening cohort; **US · France · Spain**, 2014–2019, three annual rounds (3).
- 2,847 enrolled → **2,743 analyzed** with complete PLCom2012 and PLCOci scores (104 patients excluded due to absence of either score).
- **PLCOci** (regularized Cox model): age, sex, smoking history + hypertension, cardiovascular disease, stroke, COPD, prior cancer, diabetes; quintiles (Q1 ≤3.40 → Q5 >4.48), dichotomized at the **median 3.90**.
- **PLCom2012** dichotomized at the **2.0%** six-year risk threshold; no-race scores used for all analyses (race/ethnicity missing for 433 participants, 15.8%).
- Outcome: **histologically confirmed lung cancer** over all three rounds. χ^2 with linear-by-linear trend, Fisher exact test, exact binomial CI, ROC/DeLong; R 4.4.0.

GROUP DEFINITION PLCom2012 × PLCOci

PLCOci competing mortality	PLCom2012 (6-year lung cancer risk)	
	< 2.0%	≥ 2.0%
High ≥ 3.90	GROUP 2 2.4% n = 169 · 4 cases screening-ineligible, but elevated risk	GROUP 4 3.7% n = 1,201 · 44 cases highest prevalence all squamous cases
Low < 3.90	GROUP 1 1.0% n = 818 · 8 cases lowest prevalence	GROUP 3 2.9% n = 555 · 16 cases conceptually optimal screening target

Percentages are lung cancer case prevalence within each stratum. PLCOci median split at 3.90.

BASILINE CHARACTERISTICS

Table 1. Baseline Characteristics of the LEAP Analytic Cohort (n = 2,743)

Characteristic	n (%) or mean ± SD
US / European cohort	2,161 (78.8%) / 582 (21.2%)
Age, mean ± SD, years	61.9 ± 6.3
Male	1,705 (62.2%)
Current smoker	1,867 (68.1%)
Smoking duration, years	40.7 ± 8.3
White / Black / Asian	63.5% / 19.5% / 15.1%
COPD	540 (19.7%)
Hypertension	1,188 (43.3%)
Diabetes	459 (16.7%)
Emphysema	193 (7.0%)
Family history of lung cancer	613 (22.3%)
PLCom2012, mean ± SD, %	4.18 ± 5.32
PLCom2012 ≥ 2.0%	1,668 (60.8%)
PLCOci, median (IQR)	3.90 (3.49–4.36)
PLCOci ≥ 3.90	1,372 (50.0%)
Lung cancer cases	72 (2.62%)
Stage I (of 71 staged)	41 (57.7%)
Adeno / SqCC / SCLC	40 / 14 / 12

KEY NUMBERS

- Overall lung cancer detection rate was **2.6%**.
- **2.0×** higher prevalence at high vs low PLCOci (3.50% vs 1.75%, p=0.006)
- **83.3%** of all cases (60/72) had PLCom2012 ≥ 2.0%

DISCUSSION and CONCLUSIONS

- Concurrent stratification produced a **significant stepwise gradient** in prevalence, though PLCOci added no incremental AUC over PLCom2012 (DeLong p=0.114).
- **Group 4** had the highest prevalence: a high comorbidity burden does **not** negate screening benefit.
- **Group 2** is excluded under standard eligibility by PLCom2012, yet carries ~2x the prevalence of Group 1 — a candidate for enhanced shared decision-making.
- Stage was **unchanged** across strata, but **histology shifted** toward squamous and small cell in Group 4.
- Limitations: mortality outcomes were not available at the time of analysis.

- **Actionable:** Clinicians may apply PLCOci alongside PLCom2012 at screening referral, because high-PLCOci candidates merit individualized shared decision-making. Prospective studies incorporating mortality outcomes are needed to validate these findings.

A high PLCOci should inform individualized shared decision-making — not exclusion from screening.

RESULTS

A. Prevalence by quintile — PLCOci and PLCom2012

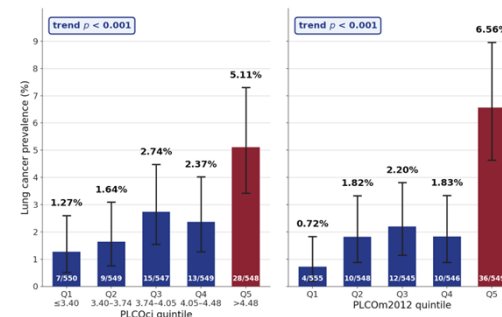


Figure 1A. Lung cancer prevalence rose stepwise across PLCOci quintiles (1.27% → 5.11%) and PLCom2012 quintiles (0.72% → 6.56%). Error bars, exact binomial 95% CI.

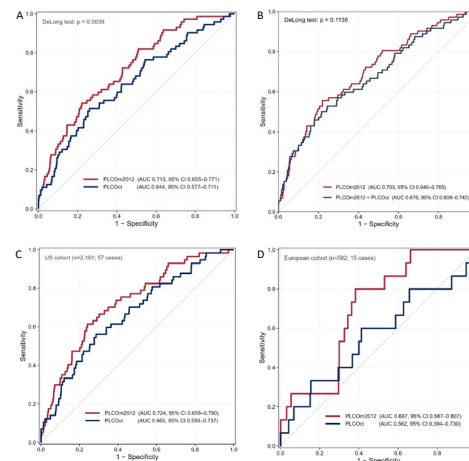


Figure 2. ROC analysis for lung cancer case detection. (A) PLCom2012 discriminated better than PLCOci (AUC 0.713 vs 0.644; DeLong p=0.004). (B) adding PLCOci to PLCom2012 yielded no incremental discrimination (AUC 0.676 vs 0.703; p=0.114). (C, D) PLCOci was discriminative in the US cohort (AUC 0.665) but less discriminative in the European cohort possibly due to smaller sample size (AUC 0.562).

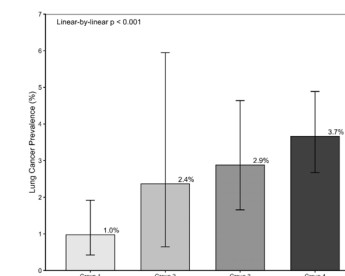


Figure 1B. Prevalence across the four groups defined by PLCom2012 (2.0%) × PLCOci (median 3.90). Error bars, exact binomial 95% CI.

D. Stage at diagnosis across the four strata

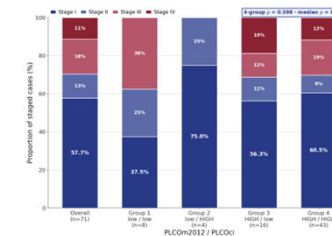


Figure 3. Stage at diagnosis (71 staged cases). Stage I was 57.7% overall, with no significant difference across the four groups (p=0.598) or PLCOci strata (p=0.776).

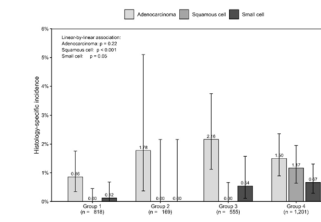


Figure 4. Histology-specific incidence across the four groups. Squamous cell carcinoma occurred exclusively in Group 4 (p<0.001); adenocarcinoma showed no gradient (p=0.22); small cell carcinoma, p=0.05.

REFERENCES · ACKNOWLEDGEMENTS · DISCLOSURES

References

1. Tammemägi MC, Ruparel M, Tremblay A, Myers R, Mayo L, Yee L, et al. USPSTF-2013 versus PLCom2012 lung cancer screening eligibility criteria (International Lung Screening Trial): interim analysis of a prospective cohort study. The Lancet Oncology. 2022;23(1):118-42
2. Gendarme S, Ingeles E, Long JP, Fahrmeiner L, Dennison JB, Ghazemi SM, et al. Impact of comorbidities on the mortality benefits of lung cancer screening: a post-hoc analysis of the PLCO and NELST trials. Journal of Thoracic Oncology. 2021;20(5):565-76.
3. Dennison JB, Gendarme S, Kettner NM, Godoy MC, Philley JV, Antoroff MB, et al. The LEAP Study: A Multicenter Biospecimen and Imaging Research for Lung Cancer Screening. Cancer Epidemiology, Biomarkers & Prevention. 2026;35(1):39-48.

Acknowledgements We thank the LEAP investigators and study participants.

Disclosures The authors declare no conflicts of interest relevant to this work.

AI use disclosure Generative AI (Claude, Anthropic) assisted with poster formatting, figure preparation, and text editing; all data, analyses, and scientific interpretations were performed and verified by the authors.