

# Incremental Burden Attributable to Exposure to Socio-Environmental Factors on Patients With Lung Cancer in France

AUTHORS

**Maëlle Youinou**  
Analyst Real-Word Solutions,  
Alira Health  
maelle.Youinou@alirahealth.com

**Mathieu Rosé**  
Director Real-Word Solutions,  
Alira Health  
mathieu.rose@alirahealth.com

**Batourou Sano**  
Consultant Real-Word Solutions,  
Alira Health  
Batourou.sano@alirahealth.com

**Jean-François Ricci**  
Chief Access Officer – EVP, Real-Word Solutions,  
Alira Health  
Jf.ricci@alirahealth.com

**Nicoleta Petrica**  
Associate Director, Real-Word Solutions,  
Alira Health  
Nicoleta.Petrica@alirahealth.com

## OBJECTIVE

- > Since 2004, France has implemented national environmental health plans aimed at addressing the effects of environmental changes on public health, with a focus on prevention and risk reduction, including the incidence of cancer, particularly lung cancer (LC).
- > This study seeks to assess the impact of socio-environmental factors on occurrence of metastatic lung cancer (mLC) and to estimate the additional burden associated with exposure to these factors. The project has received approval from the French regulatory authorities (CNIL approval).

## METHODOLOGY

- > **Data sources:** The French national hospital claims databases (PMSI) merged with open-source environmental and socio-economic data at the patient level using postal codes information.
- > **Study design:** Adult patients with LC were identified based on the French Health Insurance disease mapping definition and were hospitalized for LC (ICD-10-CM codes C33, C34, D021, D022), between January 2017 and December 2022. mLC patients were defined by having at least one metastasis-related hospitalization (codes C77-C79) occurring within 90 days after a hospitalization for LC.
- > **Statistical method:** Multivariate logistic regression (LR) was used to assess the impact of socio-economic and environmental factors on mLC diagnosis. The additional burden associated with exposure to socio-environmental factors was estimated using attributable fractions methodology.
- > **Outcomes:** The study estimated the risk of developing metastases linked to each factor, the proportion of mLC patients attributable to socio-environmental factors, and the annual number of additional hospitalizations caused by these factors.

## RESULTS

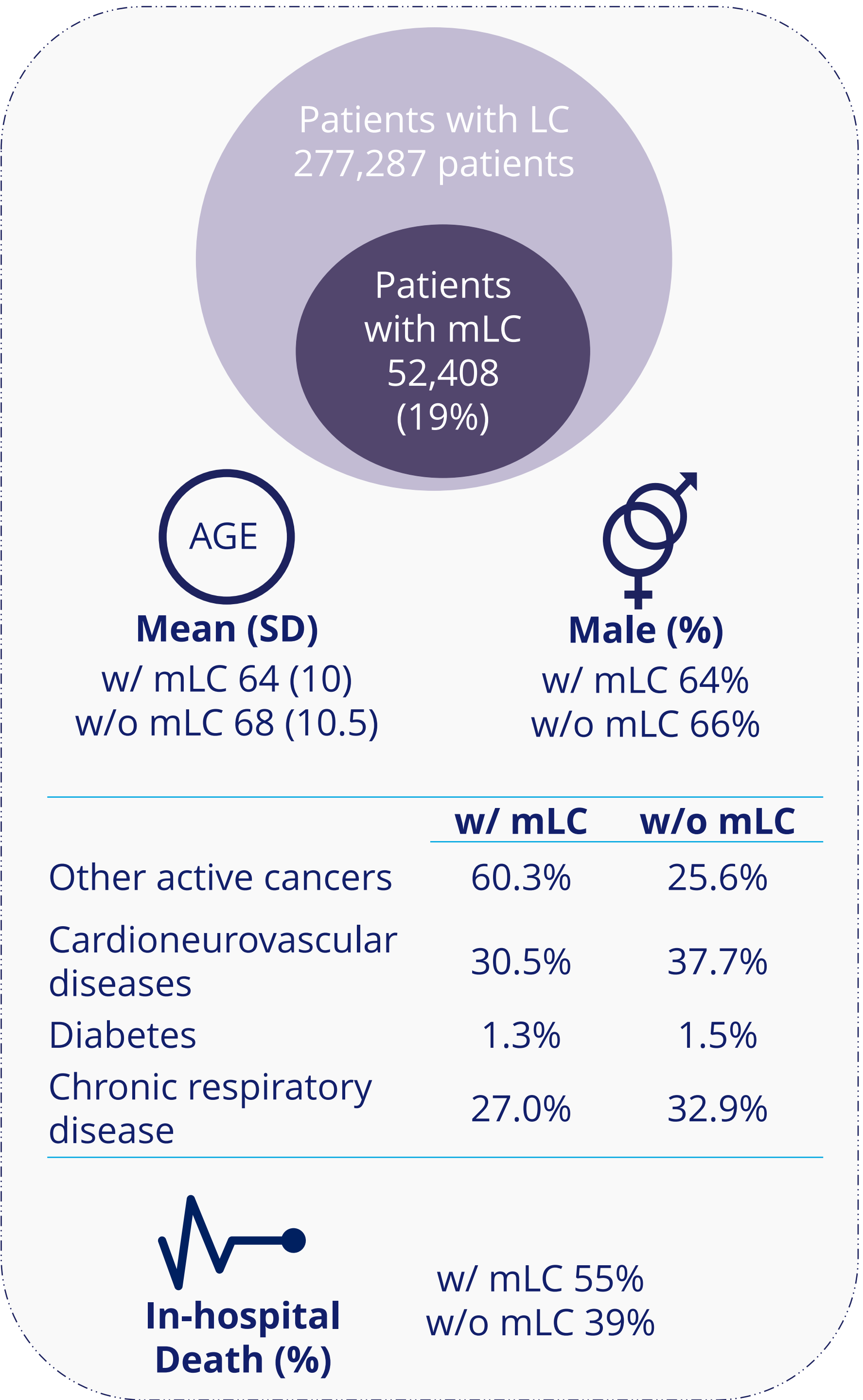


Figure 1 : Baseline Characteristics

- > A series of regression models were constructed and evaluated, each incorporating distinct permutations of explanatory variables. The model selection was based on the minimization of multicollinearity risk and interpretability within the context of the research.

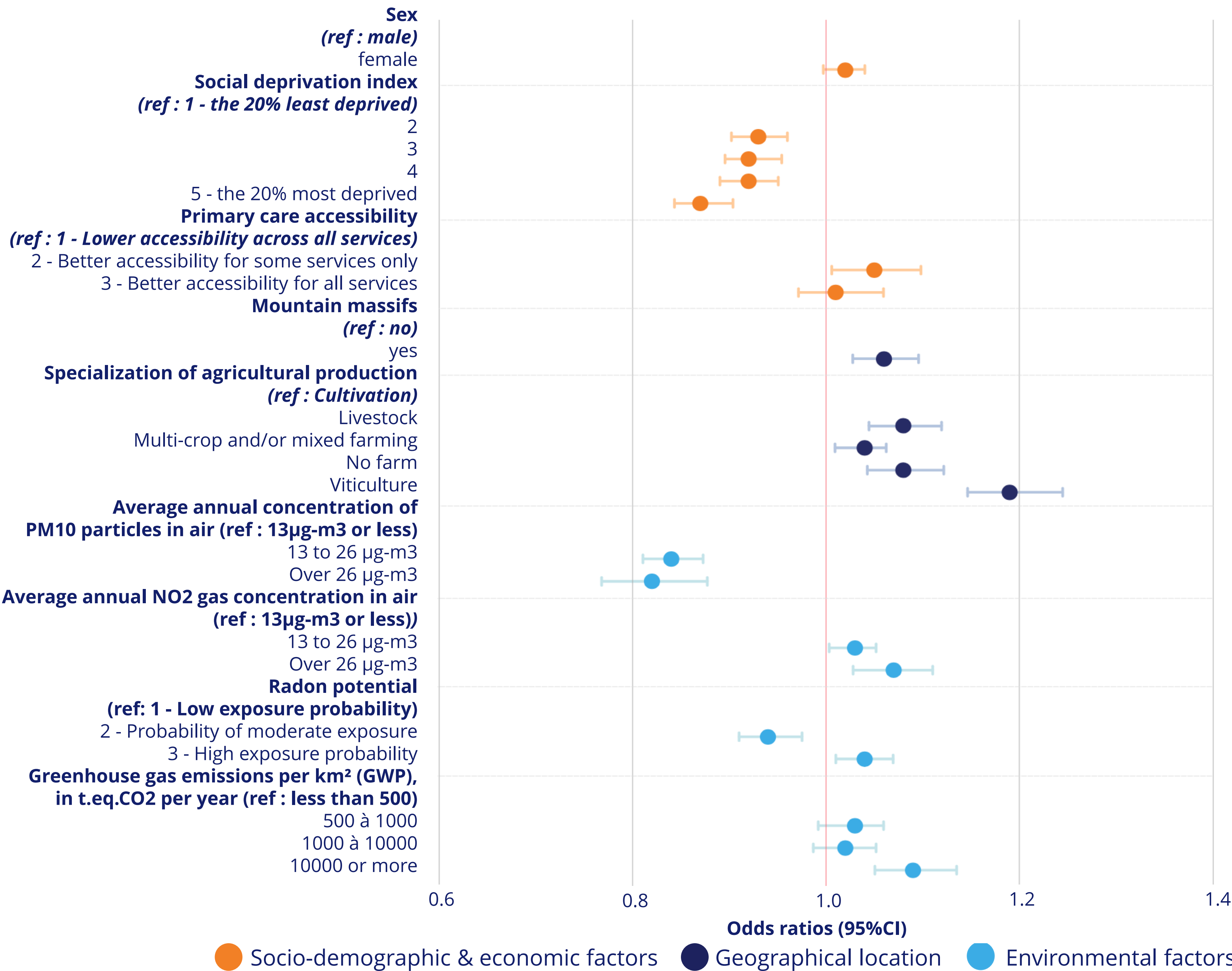


Figure 2 : Forest Plot – Outcome: Having or Not a Metastasis (Y = 1/0)

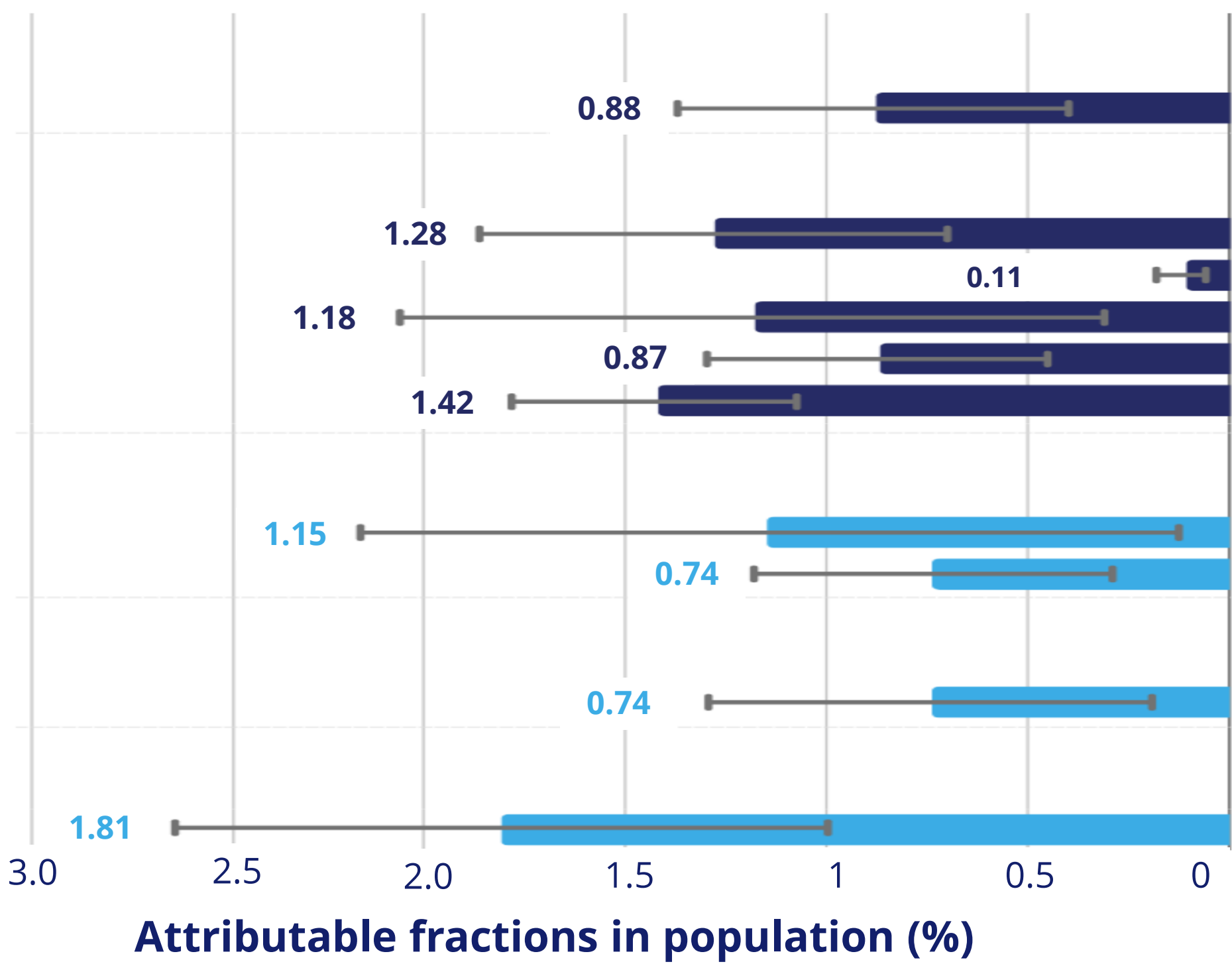


Figure 3 : Incremental Burden

## CONCLUSION

- > This pioneering study integrated French open-source environmental data with the PMSI database to assess the additional burden of socio-environmental factors on mLC development. The findings provide valuable insights for policymakers, highlighting the need for targeted preventive measures to reduce exposure to environmental risk factors and mitigate their impact on mLC incidence.

