

Frequency of the *APOE* ε4 Allele in Alzheimer’s Disease in Brazil: A Meta-Analysis of Brazilian Studies



Laura Comassetto Andrade Duarte¹, Paola Lucchese Schütz¹, Carolina Matté Dagostini², Raphael Machado Castilhos³

¹ School of Medicine, Federal University of Rio Grande do Sul, Porto Alegre, Brazil
² Department of Neurology, Santa Casa de Porto Alegre, Porto Alegre, Brazil
³ Department of Internal Medicine, Federal University of Rio Grande do Sul, Porto Alegre, Brazil

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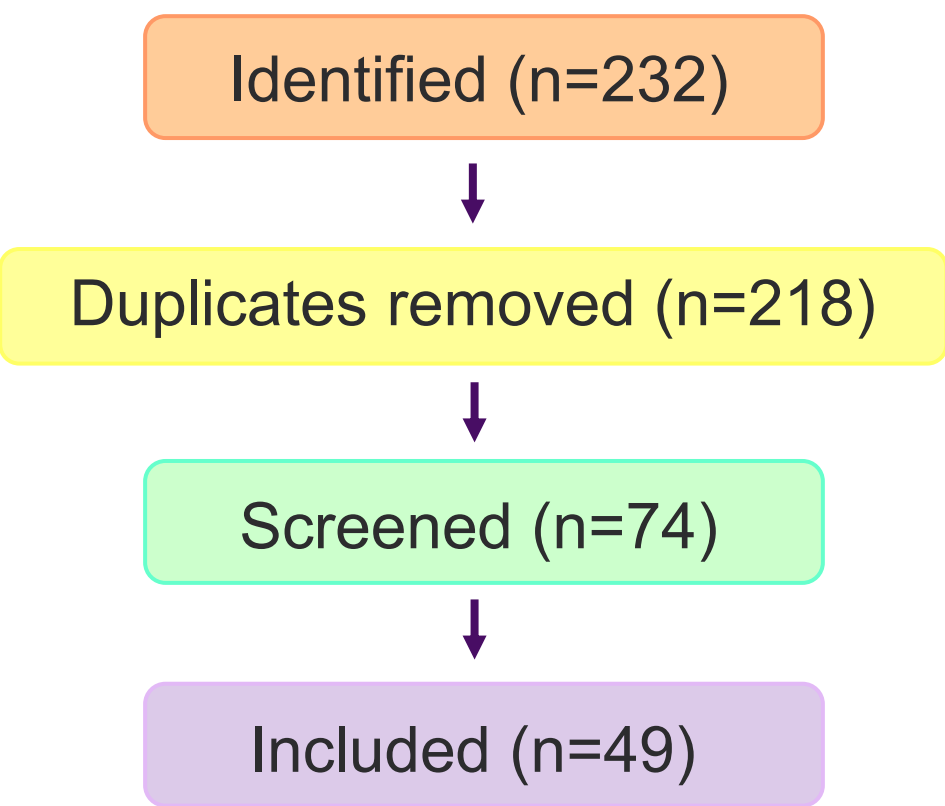
The *APOE* ε4 allele is significantly enriched in Brazilian Alzheimer's disease patients (47% vs. 20% in controls), highlighting its critical value for molecular diagnostics and upcoming anti-amyloid screening strategies in a highly heterogeneous population.

INTRODUCTION

- *APOE* ε4 is the major genetic risk factor for Alzheimer's disease (AD)^{1,2}.
- Brazil's highly heterogeneous population may influence *APOE* allele distribution³.
- We performed a systematic review and meta-analysis of Brazilian studies to estimate *APOE* allele and genotype frequencies in AD and controls.

METHODS

- **Eligibility:** observational research (cross-sectional, case-control, and cohort studies) reporting *APOE* frequencies in clinically or molecularly confirmed AD and non-demented controls.
- **Search Strategy:** Systematic searches across PubMed, SciELO, and LILACS databases.
- **Data Synthesis:** Pooled estimates calculated using random-effects models; 95% confidence intervals (CI) derived via the DerSimonian-Laird method.



RESULTS

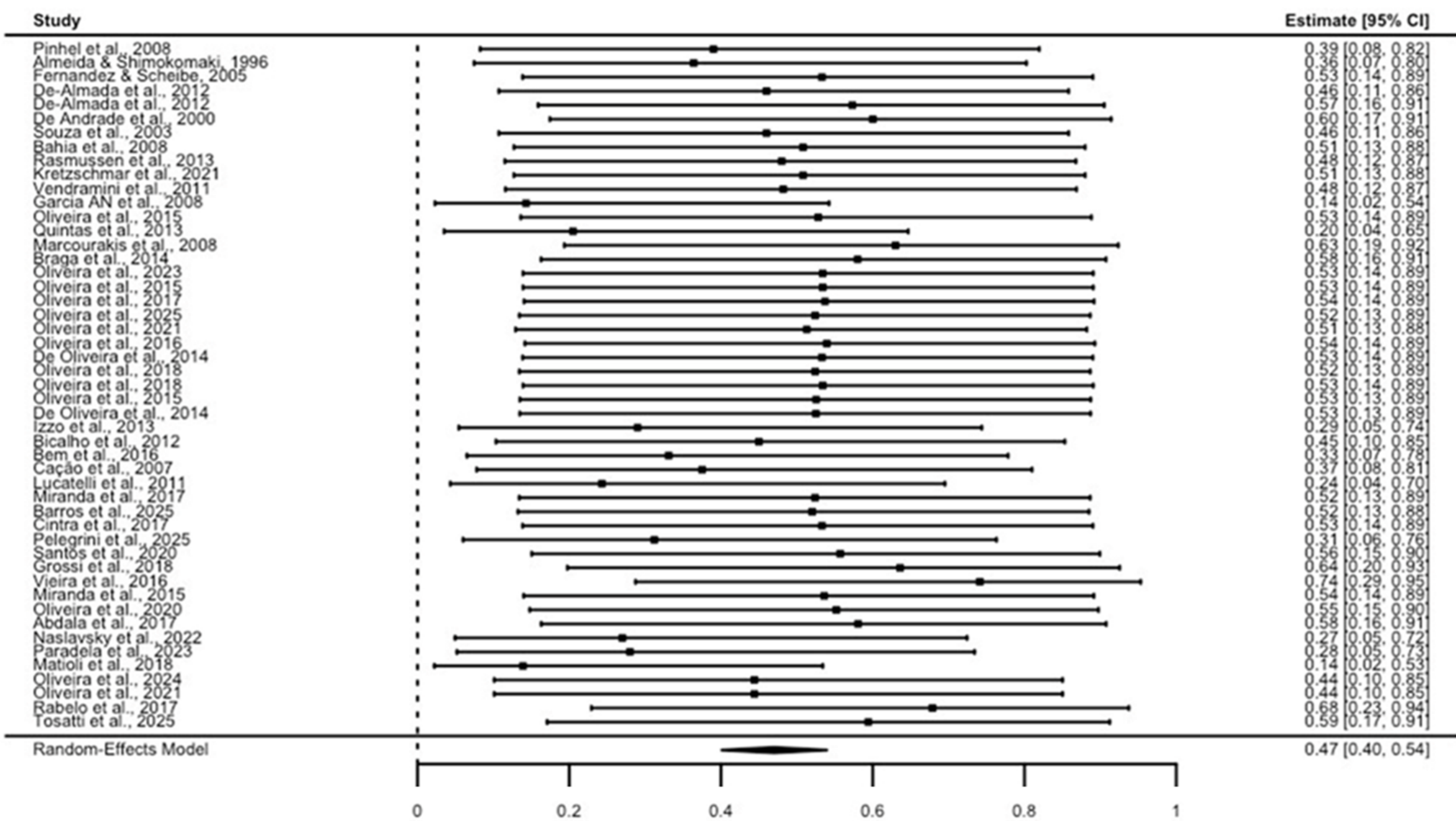


Figure 1. Pooled *APOE* ε4 allele frequency in Brazilian patients with AD (Random-effects model: 47%; 95% CI: 39%–54%).

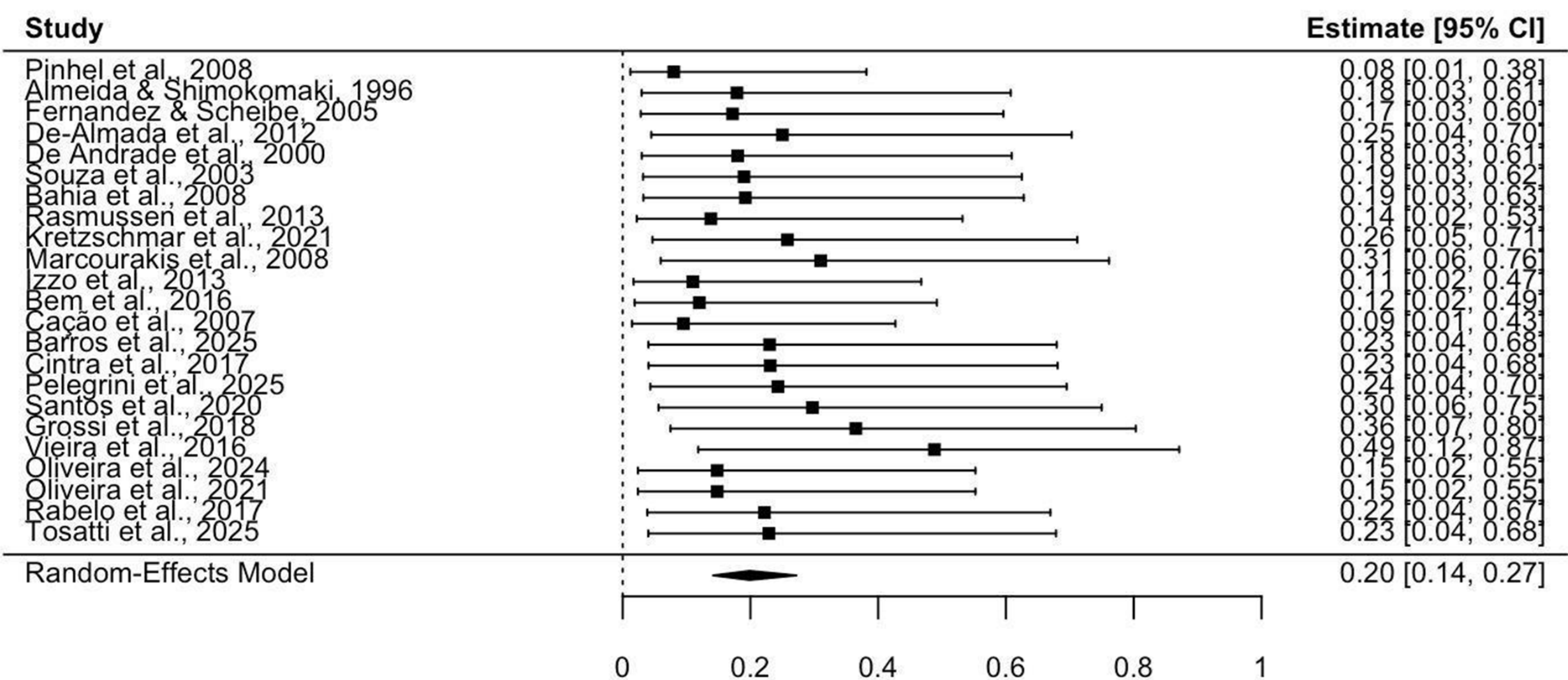


Figure 2. Pooled *APOE* ε4 allele frequency in non-demented Brazilian controls (Random-effects model: 20%; 95% CI: 15%–26%).

Table 1. Allelic frequencies of the *APOE* gene in Brazilian patients with AD and non-demented controls.

	AD	Controls
Pooled ε4 Allele Frequency (%)	47 (39–54)	20 (15–26)
Allele Frequencies (Median [IQR])		
ε3	63.82 [63.20–67.58]	83.00 [80.30–87.85]
ε4	32.10 [28.70–32.59]	10.72 [7.40–12.22]
ε2	4.00 [3.90–5.32]	6.25 [4.22–7.58]

Table 2. Genotypic frequencies of the *APOE* gene in Brazilian patients with AD and non-demented controls.

	AD	Controls
Genotype Distribution (%)		
ε3/ε3	43.00	71.85
ε4/ε4	11.40	0.70
ε2/ε3	4.60	8.50
ε4/ε2	3.50	0.00

CONCLUSIONS

- The higher frequency of the *APOE* ε4 allele in Brazilian AD patients reinforces its role as a robust genetic risk marker, aligned with global populations.
- These data highlight the critical importance of integrating molecular biomarkers into early diagnostic frameworks and public health strategies for dementia in Brazil.

REFERENCES

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3. Guimarães HC, Barbosa MT, Carvalho VA, Caramelli P. Apolipoprotein E polymorphism in a Brazilian population with Alzheimer's disease. *Arq Neuropsiquiatr*. 1998;56(1):13-7.

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CONTACT

Laura C. A. Duarte —
lcaduarte@hcpa.edu.br

